THE NEW AGE OF FAITH

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BY JOHN LANGDON-DAVIES

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To
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THE NEW AGE OF FAITH

INTRODUCTION

In this book two related questions are discussed; first, what has science to tell us about human society? and second, how far will human beings listen to what science has to tell them? The second of these two questions is really the more important, because unless human beings are willing to follow the dictates of organized common sense, as we have been taught to call science, it does not really matter at all, so far as social progress is concerned, how many truths are dug up by diligent scientists: the truths may glitter like diamonds in the light of the scientist's brain, they will be as invisible as a black cat in the dark room of ordinary human striving.

It is common sense, for example, that too much candy is bad for children, but the chances are that the emotional check of fear will stop a child's overeating long before any knowledge of physiology. Common sense about physiology, it is true, is behind the parent's sharp "don't eat any more, or I'll—," and it is just possible that society may say, "I am a child, or rather a large group of children and I will appoint a number of scientists, specialists, experts and busybodies to be my foster parents, armed with organized common sense to tell me what is good for me"; it is unlikely, but it is possible; and a small number of people exist who think it would be desirable. And so we shall consider in this book what would be likely

to happen if those foster parents were appointed. We will also examine the potential foster parents' claim to a great and good scientific knowledge about social needs and aspirations.

And again we will ask if organizing common sense does not sometimes end in organizing it away altogether; if the self-styled scientists, who want to save society, have not in some instances every sense except common sense; and in other instances no sense at all. We shall have to look into each of these questions.

But first of all, why "The New Age of Faith"? Because we are going to deal only with the problems of the present day; with the question, can science save our present social life; with the needs, aspirations, difficulties and perplexities of A.D. 1925:—and no other age has been so noticeably an age of faith as the twentieth century. The distinguishing feature of our age is that we take more things on faith than any other age has ever done. True, we do not all of us believe with the fervour of our ancestors in God or the Devil; for in the direction of orthodox religion, the sun seems to be nearing a very red western horizon; but in spite of this we believe in more things, for which our reason cannot account, than did any monk in a medieval cloister. Moreover our faith is not merely a Sunday one; it is called into action in all the petty uses of our daily lives, and never more so than at the moments when our ancestors could afford to be most rational.

Look, for instance, at the medieval farmer going to market on his mare; he knew well enough the forces

which propelled him thither: he knew not only how to control them but why certain acts would produce certain results: thus, if he wanted to go faster he had but to use the same sort of stimulus which would appeal to any boy, had often appealed to himself, indeed, as boy and man; namely, the stimulus of the stick. And because humanity is animal the farmer understood, emotionally as well as intellectually, the reaction of the mare to the stimulus: he understood that he got to market faster because mare and boy alike do not want an unpleasant stimulus repeated. Further than this there was free will also; if the mare chanced to be a donkey, and valued her obstinacy more than she feared its consequences, she could choose to endure a second and similar stimulus rather than mend her pace. No mystery here, no exercise of faith on the part of the farmer; for it has never been free-will but always determinism, which has seemed a mystery to mankind and in need of an explanation.

Now, compare with this picture, our own fate to-day: we are in a Ford car; we want to go faster, our foot presses the mechanism and we shoot forward; why? Honest folk say, "heaven knows"; meaning that they shoot forward in response to an act of faith: less honest folk will be learned and mechanical; use long names and clothe their ignorance, more or less considerable, behind them; admit, if pressed, that behind such long words looms the unknown and for them unknowable. Unless, in short, we understand the mechanics of motor cars in general, and of Ford cars in particular, we do not really

know why the stimulus produces the result, we know nothing about the connections between our foot and the force it controls; or at least what we do know of this connection is precisely what was once believed about the connections between a prayer and the deity:—pressing down the lever is a prayer to an unknown force, made in the perfect faith that the force must answer the prayer.

All that has happened, indeed, is that the faith has increased to a certainty; for while the old prayers were not very often answered, and the forces to which they were offered had free will and used it, our new gods, though still unknown it is true, are gods in chains. And this is the triumph of faith, so to enslave the god, that the god is bound to obey. This is perfect faith, the faith which presses down a lever to command an unknown force, knowing that the force, however unknown, must obey. And this faith is present everywhere in our New Age of Faith; it permeates every detail of our lives, producing its own type of outlook to life itself and forcing, as we shall see, even science and scientists to bow beneath its yoke. Let us, then, consider a few more examples.

Once upon a time the housewife could get first, light, then, heat from a simple enough source, her tinderbox; nothing more easily to be understood than this; no need for faith, nor for the mental attitude which a constant exercise of faith produces. But look at the same good lady to-day; what housewife understands the forces which she sets free, when she presses a button and sum-

mons electricity out of the gloom? What percentage of the population can follow the force or forces all the way from the glowing electric stove to the distant dynamo and beyond? Plainly a larger percentage has to take it all on faith; and the pressing of the electric button is just such another prayer as the pressing of a Ford car control.

True there was a greater amount of superstition of a sort in the older age of faith: the housewife, for instance, believed in fairies, who would do her work while she slept, in exchange for a few little kindnesses on her part; a belief which declined hundreds of years ago, as Bishop Corbett tells us in his great poem:—

> "Farewell rewards and fairies,
> Good housewives now may say;
> For now foul sluts in dairies
> Do fare as well as they. . . ."

But even if the fairies did not exist, at least the idea of them was more rational than the idea of the electric laundry washer, which fills their place:—what is electricity? We take it on faith, whereas we took the fairies on illusion.

The farmer, too, greased the post against which the mare had grazed her leg, in order that the graze should heal more rapidly; this was superstition, no doubt, but the farmer was wrong only because in some way or other he imagined that the post was human and its matter susceptible to kind treatment; whereas to-day heaven, literally, only knows what the physicist thinks the post is made

of, and though we need not consider the physicist superstitious when he talks of atoms and electrons, it is only by faith that we can accept his statements. This, therefore, is an age of faith; not necessarily, however, of superstition, for faith and superstition are not the same.

Science has done more than this towards undermining our reason however; for it has taken the very ground from under our feet, and substituted a nightmare myriad of atomic solar systems, so much the reverse of solid, they tell us, that if the central sun in each were as big as the old-fashioned one, which still gives us light, in spite of the scientists, the outer planets within the atom would be as far away as, or farther away than, Neptune. What chance of justifying that view of this grassy bank except by faith!

Of course somebody's reason comprehends it, discovers its truth indeed, but not our own; and we cannot forget that somebody's reason has discovered a number of things, which did not turn out satisfactory in the long run: faith in our brother's reason, indeed, is in no way different from faith in God: it may be the wrong brother, just as it may be the wrong god.

In short, if we think for a moment of the world in which we live; a world of X-rays, of radium and radio, of telephones and telegrams, of magnets and magnetos, of light and heat, as they are now conceived, of atoms, protons and electrons, of finite and unbounded space, of every sort of unknown and invisible force;—how many of us can see such a world as credible by logic and reason alone? How much of all this must we not rather take on faith?

Some people it is true can claim all these as the daily companions of their intellectual walks abroad, just as Enoch could claim to "walk with God" and therefore presumably, to know him otherwise than by faith; but we can most of us make no such claims. Ninety-nine men out of every hundred approach science and its works in the same spirit and through the same gateway as their ancestors approached God and His. This is why we may call the twentieth century a New Age of Faith.

And the name is not merely an idle whim; it is used deliberately to underline something, to emphasize certain tendencies, which need to be underlined and emphasized. Men are to-day more than ever in danger of thinking that they use their reason; that they are guided and actuated by rational processes; that the days of blind faith and unsupported guesses are over, and that now society moves more and more towards scientific deliberateness and a spirit of "organized common sense." Now the truth is that even the modern attitude towards science is irrational to a degree which it would be hard to overestimate. What has happened to produce this result?

In the first place, we know that when white men have first appeared among savages, the latter have often mistaken them for gods and worshipped them and their attainments. Now among us to-day the gap in intellectual attainment and knowledge between the average man and the scientific specialist is far greater than the similar gap between a white explorer and a savage; and the average man has taken a leaf from the savage's book—to use a metaphor strictly impossible, seeing that the savage is un-

lettered—and exalts the scientist onto a high pedestal, whence he must receive the barbaric homage of people who do not really understand or appreciate either his achievements or his possibilities.

In the second place, men are born worshippers and only become reasonable and rational after a long discipline; but the modern passion for democratic education has given countless masses the implements with which to approach science without the discipline to approach it intelligently. And so the halls of science have been thronged with hosts who are only fit to worship and wonder, not to criticise and understand.

And in the third place, life itself, for all our wealth and comfort, has become so unsatisfying, and the future, unconsciously at least, so menacing, that we need a new religion for moral support, and have found it in science.

It is because these three tendencies are so important for the understanding of the relations between science and society that it seemed worth while expressing them in the title of this book: for many of the phenomena which we shall observe will be more clearly understood if we start by emphasizing the humanistic side of science. Too often people put science outside the universe of human emotions and desires, and raise it up on a pole like a cold-blooded super-reptile, even as the serpent in the wilderness was raised up; a rational entity apart and above. Just below, but still reptilian in coldness of blood and lack of emotion, are placed the scientists, a strange group of statues, immovable above the flood of human futility and emo-

tionalism. Science and scientists in this sense are companion in this: they simply do not exist.

Science, it is true, is the child of reason; but it has to enter into the popular mind by the gateway of emotion: unless it has what the movie public calls a heart appeal, it might as well not exist. This is a painful and unpalatable truth, which scientists in particular will find it difficult to accept: nevertheless, when we study science in its social aspects, we must begin by accepting its limitations; we must not hope to find pure reason; we can at best hope not to find pure prejudice. Science, as we have said, is like an explorer suddenly come among savages; it is surrounded by men born to worship, and worship it must force itself to accept. "There is one science, and Haeckel is its prophet," has always been the typical formula used by the super-faithful in face of opposition.

There is another characteristic of the New Age of Faith, which must be mentioned in these introductory sentences, and that is the amazing humility of the average man in the presence of science or scientists. Humility is the very hall-mark of religion: religion began, so students of social origins tell us, with the birth of humility; when the savage stopped commanding mountains to move, and in a humbler spirit begged some deity to move them for him. Just such a humility characterizes the New Age of Faith, a humility born of the average man's sense of his own ignorance and insufficiency joined to an admiration of the priest of science, which comes from quite a different cause. The priest of science, like all other priests

the world over, tends in most cases to be ill paid for his services; his office has its drawbacks. Among more primitive races the priesthood was hedged about with so many restrictions and pains and penalties, that it took a man of character and idealism to accept them all; with us the restrictions and pains and penalties are less picturesque than with savages, but they exist, usually in the form of low salaries or no salary at all; and as the average man thinks first of all of his salary, he has a great admiration for the scientist, who is willing to work for so little. Thus, humility and admiration on the part of the average man have set a considerable halo about the head of the scientist; and halos are dangerous above all to the reason as they are apt to obscure clearness of vision with their haze. Moreover the man in the street assumes that no one who professes and calls himself a scientist could possibly be anything else but noble and wise; for otherwise how would he be willing to undergo the penalties, the low salary, the long education?

Alas! the man in the street, like man anywhere else, seldom learns by experience, or he would know by this time that charlatans covet halos so much that they will always pay a heavy price for the privilege of wearing one. Moreover the art of eating one's cake and having it is known even to the priests of the lowly Toda tribe in India, who enjoy the privileges of their office and yet avoid the penalties often in a most ingenious manner: thus when complete segregation from women is demanded of them, and they are enjoined to "turn their back on every woman," they obey the letter of the law

and receive their dulcineas wearing their garments back to front. Hence it does not follow that a Toda priest is a man of high ideals and truly called to his vocation; and the New Age of Faith also is remarkable, for the enormous number of pseudo-scientists masquerading in borrowed plumes, having sworn to turn their back on the lucrative and easy Error, yet entertaining her with clothes reversed and thereby preserving a semblance of scientific truth. We shall examine these gentlemen of easy virtue later. We have them always with us because of the working of the laws of supply and demand, just as Billy Sundays and Bryans supply a demand for a religion adulterated in order to make it palatable. . . .

The New Age of Faith. Such then is the subject matter of our book; the interplay between science, a body of ascertained truth, and man, who wants that body to contain something different from what it does contain. Man wants practical results to-day; science offers a method which holds some promise of results in a distant future: man, being a baby, will not be happy till he gets what he wants, and to stop his crying pseudo-scientists dish up a meretricious substitute for the truth. If man eats too much of it, he is likely to be sick; and at any rate he will be better for a purge. This book is a purge.

We begin with the collapse of an idol: the idol is the one worshipped by scientists a generation ago; it had an optimistic look about it, until it fell off its pedestal; but now, though glued together as well as possible, it has a pessimistic look. We begin by discussing why this should be and we then describe the different ways in which man

has hoped hitherto to control his destiny: can we find any hope, we ask, of his controlling it in the future by scientific knowledge of heredity, eugenics, and biology in general?

In the next part we attack various authors who have misled the public about the facts of science on these subjects, and then in the final part we state the cold facts for which science can really vouch, offering them as a basis for the understanding and solution of the social problems dependent on them.

And so in the end we ask once more if man can save himself through scientific knowledge from what looks sometimes like an inevitable doom. Whatever we may think about this problem, we will probably decide that man must first be saved from the pseudo-scientists.

So much by way of introduction; one thing remains to be said. Though facts are facts, more or less, even on scientific subjects points of view are individual and subjective. If they are not precisely individual, they are conditioned to a large extent by the atmosphere in which a man has lived; it will therefore not be irrelevant to remind the reader that this is a book written by a European for Americans to read.

Now, there are certain broad lines along which all Europeans tend to think differently, or perhaps it would be more accurate to say, feel differently, at the present time, from all Americans: that is not of course anything more than a generalisation, crude indeed, but with a vital truth in it. Though it would horrify Dr. Lothrop Stoddard, for example, it is nevertheless true that in some

ways an Englishman might even find Spain and the Spanish view of life less foreign to him than America and the American view of life. How is this so?

In one of his remarkable essays Miguel de Unamuno, who is never tired in other places of contrasting Spain and Europe, says: "If I am to tell you the truth, it hurts and wounds me to see men marching as confidently as if they marched on solid ground, some confident in the prejudices and anti-prejudices of their religious beliefs, others slaves of science, others slaves of ignorance, slaves all of them. I would have them doubt, I would have them suffer, above all I would have them despair, I would have them be men and not mere partisans of the party of progress."

In those words we have perhaps, the expression not of a Spaniard in contrast to a European, not of the average man anywhere—he is uniformly optimistic in all latitudes—but of the European post-war intelligentsia as contrasted with the American. Though we may not wish you to share such an outlook, we do sometimes wish that you could understand why some people have it. That you cannot, is because Europe is poverty-stricken and disillusioned, while America is prosperous and optimistic. And the same contrasted plight may cause misunderstanding between the readers and writer of this book; also. Let us see how.

When the contemporary scientist turns his attention to the problem of human social destiny, he tends to a feeling of depression and gloom; but in America especially, that pseudo-science, which exists only to give the

paying public what it wants, is, in some quarters, noticeably optimistic. One American club secretary, for example, described the address of a popular lecturer as having "a fine spirit of optimism about it that charmed the members, while it appealed to their solid business sense in no uncertain way" and the possession of this businesslike optimism made of its owner, "a regular fellow, with a he-man's grasp of modern problems."

If we in Europe were also prosperous and happy we would certainly voice something of the same idea; in fact we did so during the latter part of the Victorian age, when we were convinced that everything was for the best in the best of all possible worlds; but as we are not prosperous and happy to-day, we can revenge ourselves by pointing out the mote in our brother's eye.

This mote would seem to be the application of business methods and ideals to science: optimism appeals to solid business sense, therefore by all means let us have optimism at the expense of scientific accuracy and common sense; that is the salesman's attitude to science.

Optimism, of course, has its place, and that place is business, for the salesman must believe in his product so that he may convince everybody that it is better than all rivals; but in science only the pseudo-scientist deals in such methods. The real scientist is first concerned with the truth, and scarcely at all with its effects upon people's nerves and prejudices; and since he builds for all eternity and not for time, he would rather admit present ignorance, than have a false truth inevitably discovered in the distant future.

And the public must learn to wait for the truth until it has been discovered, though it is often so much more easy to read the scientific romances of the Sunday magazine section. Moreover, the fact that distracted Europe once, not so long ago, had very much the optimistic club secretary's outlook on science, suggests that that outlook is not in itself a sufficient safeguard against future discords; and therefore there is something to be said for a devil's advocate of a less certain and dogmatic belief in progress; of the need for reserved judgments and admitted ignorance on many matters; and of the point of view expressed once more in the works of Miguel de Unamuno: "And since man is naturally intractable, and does not habitually thirst for the truth, and after being preached at for four hours usually returns to his inveterate habits, these busy inquirers, if they chance to read this, will return to me with the question: 'Well, but what solutions do you offer?' And I will tell them, once and for all, that if it is solutions they want, they can go to the shop opposite, for I do not deal in the article. My earnest desire has been, is and will be that those who read me should think and meditate on fundamental things, and it has never been to furnish them with thoughts ready-made."

To quote this at the beginning of so small a book must be humbly, as an ideal attempted, and not as a task accomplished.

PART I

THE PROBLEM

CHAPTER I

THE COLLAPSE OF AN IDOL

THE ancient Greeks had a goddess of Science and Wisdom, an austere lady with grey eyes, a helmet for a hat and an owl for a pet;—Pallas Athene.

She was rather forbidding when compared with some of the other ladies in Olympus but from every point of view suitable for her position. Her austerity, her balance, her coldness fitted her for the chancellorship of an ancient university, where young men were brought up to be students of gymnastics and music: and though, in her official capacity she had, as it were, to be grey eyed, there are rumours that when off duty she could be, on occasion, as human as any other Greek goddess.

A god or a goddess is the reflection of the worshippers' mentality: Pallas Athene tells us quite clearly what the Greek scientist was like. We notice that there was no vulgarity about him; Athens was an aristodemocracy founded upon a base of innumerable slaves; the slaves did the dirty work, the few citizens thought the high thoughts and, untainted by common occupations, kept a magnificent standard of education; and kept it to themselves. The slaves, the movie public of the day, cared nothing for science, and, in consequence, science

cared nothing for them; it did not popularize itself, nor cheapen itself for their benefit: it remained science, full of doubts and speculations; and never became popular science, full of wonders and boasting beyond its honest limitations.

So Pallas Athene does not in any way represent the god of modern popular science and quite a different idea is needed to reflect the mentality of its worshippers. Let us see if we can form a picture of this later god.

A generation or so ago the idol of popular science was a porcelain god, all-powerful but benignant, beaming down upon a reverent world, its arms crossed over a naked and well-filled belly; not at all like the classic lady; but rather seeming to have sacrificed athletic and musical beauty for pregnant laboratory thought. "I may not be much good at a Marathon," it seemed to say, "but, by Jove, I will give you a civilization powerful though ugly, marvellously efficient though deformed, full of invention though unimaginative, a paragon of luxury though comfortless; I will produce supermen by the simple device of perfecting Robots." And all its worshippers shouted together for joy. No religous sect ever announced the millennium so openly as did the scientists of Spencer's generation.

Then, one day, something happened: whether or not it was bored by the acclamations of the worshippers, which as our wonderful century was weaned from Victorian romanticism, became more and more fulsome; for this or some other reason the porcelain god deliberately

and without external propulsion toppled off its pedestal and dissolved into a scattered medley of potsherds. The popular scientists gathered up the fragments that remained and glued them together again with reverent care, until the little idol once more reflected their thoughts and emotions; but do what they could, they could not bring back into its erstwhile genial features the same expression of silent encouragement to optimism. The fall had been too much; it had brought on a neurosis which was revealed by a haunted expression suggesting fear of an inevitable danger: and all around the popular scientists began to ring alarm bells, where formerly they had been beating tomtoms of success. . . .

The most significant fact about our intellectual life to-day is that science has become exceedingly alarmed about the future prospects of humanity. The change has been sudden and complete; thirty years ago the marvellous growth of scientific knowledge and invention produced a universal optimism; nothing was too great for science to promise us; to-day scientists are denying the very possibility of progress and are warning us that unless society begins to take serious steps towards controlling its destiny, it will be submerged in something more destructive than the Deluge. Let us compare some typical utterances of scientists a generation ago with what is being said to-day: we shall certainly find the change startling enough; it is not a case of assorted greys, but of white and black.

A generation ago Herbert Spencer wrote:

"Progress is not an accident, but a necessity. What we call evil and immorality must disappear. It is certain that man must become perfect."

and:

"The ultimate development of the ideal man is certain—as certain as any conclusion in which we place the most implicit faith; for instance, that all men will die!"

and:

"Always towards perfection is the mighty movement—towards complete development and a more unmixed good."

Nor was this simply the natural optimism of Spencer, it was to him but a logical statement of the master's own teaching; for does not the *Origin of Species* end thus:

"As all living forms of life are the lineal descendants of those which lived long before the Cambrian epoch, we may feel certain that the ordinary succession by generation has never once been broken, and that no cataclysm has desolated the whole world. Hence we may look with some confidence to a secure future of great length. And as natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection."

Now let us compare these affirmations of optimism with typical statements by contemporary scientists. Here is Mr. Bertrand Russell in *Icarus*:

"Men sometimes speak as though the progress of science must necessarily be a boon to mankind, but that, I fear, is one of the

comfortable nineteenth century delusions which our more disillusioned age must discard."

and:

"At present all that gives men power to indulge their collective passions is bad. That is why science threatens to cause the destruction of our civilization."

Mr. J. B. S. Haldane in *Daedalus*, a work which has been attacked for its undue optimism, writes:

"So far from being an isolated phenomenon the late war is only an example of the disruptive results that we may constantly expect from the progress of science. The future will be no primrose path. Whether in the end man will survive his accessions of power we cannot tell."

Dr. Schiller in *Tantalus* says:

"It appears then that we can extract no guarantee of progress either from the nature of Man or from the nature of human institutions. There is no *law* of progress!"

and:

"Civilization, as at present constituted, is very definitely a deteriorating agency, conducing to the degeneration of mankind. This effect of civilization is nothing new; . . . its discovery, however, is very recent."

and:

"The violent destruction of the human race by war will only be more *dramatic*: it will not be more *fatal* than its gradual

decay as its arts and sciences slowly fossilize, or peter out, in an overwhelming flood of feeblemindness."

Here, then, is the first part of our problem: to find out why a few years of increasing knowledge should have turned scientists from almost boundless hope to the very depths of despair. What is this effect of civilization which has been so recently discovered? Why do we now regard it as a danger to the future of mankind? To answer that will be the object of the next two chapters.

By way of introduction we need only repeat that the general consensus of scientific opinion is that if things go on as they are at present, far from progress being a necessity, as Herbert Spencer thought, it is degeneracy which is a necessity. The human mind will not of course be able to sit down and acquiesce in this state of affairs: the story goes that a Mexican was told to remain on guard in a mine, to prevent miners from working near a dangerous rock in the roof, which looked like falling; he took up his position directly under the rock, curled up, went to sleep; and was crushed to death. Now that may be the Mexican way of doing things, but it is not the human being's way; if science says we are going to the dogs or at any rate back to the apes whence we came, we will find some way of altering our direction.

Our first step will be to examine the higher scientific criticism which has come to shatter the simple faith of the Spencerian evolutionists; why this sudden change from believing that mankind's destination was next door to a heaven on earth to believing that it is next door

to a hell on earth? What have we done to upset nature's plan? And first of all we had best look at "nature's plan" itself, then perhaps we will be able to convict man the meddler of his carelessness by reason of which we are being driven in the wrong direction.

Why has the optimistic smile disappeared from the collapsed idol?

CHAPTER II

"NATURE'S PLAN"

When Herbert Spencer made statements such as those quoted above his mind was confused. To put it frankly, Herbert Spencer was drunk—drunk with the very remarkable discoveries which were being made in every direction by men of his generation. We must not, however, judge him too severely, for we excuse the excesses of a New Year's celebration and so we certainly ought to excuse the excesses of a New Age's celebration, such as that in which Spencer and his companions were having the good fortune to indulge.

And of the whole group, nobody enjoyed himself so much as Herbert Spencer; for he did not stop at one party all the time, but, to use a simile which New Yorkers will understand, he "crashed in" on a long succession of different parties all that New Age's eve; he crashed in on the biologists, the geologists, the botanists, the psychologists, the ethnologists, and everywhere he drank deep of their golden sparkling optimism; everybody was enthusiastic with new knowledge, so much more inebriating than old wine. And so Spencer had a glorious time, invented Sociology and left to later scientists the sick headache as a legacy.

It would be no exaggeration to say that these scien-

tists were so excited by their advance, by the retreat of ignorance in every direction, that they hoped to see the day when the unsolved problems of existence would be relatively few and unimportant; and in the hands of Herbert Spencer all this new knowledge was applied to man's social life with the most hopeful theoretical results. What were the causes of this general atmosphere of progressive discovery? Why did science cease to be an accomplishment of a minority and become the religion of the majority?

"Each age is a dream that is dying, or one that is coming to birth," says the poet, and it would be more accurate to say that each age is both a dying dream and a new-born dream. The dying dream here was an orthodox religion, which had no place in it for the changing conditions of the Industrial Revolution and the new needs of the rapidly growing proletariat; and the new dream, was a wise man's guess; the guess which we know as the Darwinian Hypothesis. Darwin's theory of common descent—we call it Darwin's, because he brought together the mass of evidence which has made it incontrovertible, save by the muddleheaded who can controvert anything—is the positive basis of a new age of thought, which has so permeated our minds, that we scarcely realize, without close analysis, how necessary to our intellect it has become.

Darwin collected evidence from different branches of science—from geology, geography, zoology, botany, physiology, embryology—and was able to show that all his evidence was consistent with a belief that all the different

forms of life existing or extinct on the planet had grown out of one another, had evolved from simpler forms, which in their turn had grown from even simpler ones: so that an unbroken genealogical tree could be constructed connecting man with the single-celled amoeba.

Everybody knew this was true of domestic varieties of plants and animals, that for example all the different kinds of pigeons were descended from the wild blue rock-pigeon: all that Darwin did was to say that what was true of the pigeon in captivity was true of all forms of life in nature, that each form had evolved from the same ancestors.

Stated thus in 1925 and in New York it is perhaps difficult to see why so simple a theory produced so violent a reaction, an intellectual and emotional quarrel such as had not been seen since the Middle Ages: but if we look for a moment at what was taught and believed before Darwin we shall begin to understand.

Human beings, as such, have never been particularly interested in mere knowledge; indeed, we can go so far as to say that those who thirst for knowledge for its own sake are almost always pathological; they are the sort who cram their minds with facts so as to hide their neuroses, their nervous debility, from the light of day: we must, therefore, ask ourselves what human or emotional purpose was served by Darwin's theory, that it should have been so instantaneously seized upon by the vast masses of ordinary people.

The answer to this question is that Darwin was used as a weapon and a bulwark against the terrors, hypoc-

risies and absurdities of the decadent religious teachings of the day. Tibetan lama worship was not more brutalized compared with what Buddha taught, than Victorian Christianity compared with what Christ taught.

To illustrate a point which is very important to the understanding of our subject we will quote a passage out of the "Town Labourer," which describes the conscience of the religious rich during the Industrial Revolution in England:

"In one place Hannah More mentions that the wages are a shilling a day; in another that two hundred people are crammed into nineteen hovels. Of another parish she writes: 'I will only add that we have one large parish of miners so poor that there is not one creature in it that can give a cup of broth, if it were to save a life. Of course they have nothing human to look to but us. The clergyman, a poor saint, told me, when we set up our schools there twenty-five years ago, that eighteen had perished that winter of a putrid fever, and he could not raise a sixpence to save a life.' . . .

"Now the sisters More were benevolent women who put themselves to great trouble and discomfort out of pity for these villages, and yet from beginning to end of the Mendip Annals there is not a single reflection on the persons or systems responsible for these conditions. It never seems to have crossed the minds of these philanthropists that it was desirable that men and women should have decent wages, or decent homes, or that there was something wrong with the arrangements of a society that left the mass of the people in this plight. . . .

"The employers and gentry are sometimes blamed, it is true, in these pages, but they are only blamed for their want

of sympathy with the efforts of the More sisters to teach religion. . . .

"The subject of the famine was explored . . . in a charge that Hannah More gave to the women of Shipham in 1801: 'It is with real concern that I am obliged to touch upon the subject which made part of my address to you last year. You will guess I allude to the continuation of the scarcity. Yet let me remind you that probably that very scarcity has been permitted by an all-wise and gracious Providence to unite all ranks of people together, to show the poor how immediately they are dependent upon the rich, and to show both rich and poor that they are all dependent on Himself. It has also enabled you to see more clearly the advantages you derive from the government and constitution of this country —to observe the benefits flowing from the distinction of rank and fortune, which has enabled the high so liberally to assist the low; for I leave you to judge what would have been the state of the poor of this country in this long, distressing scarcity had it not been for your superiors. . . . We trust the poor in general, especially those that are well-instructed, have received what has been done for them as a matter of favour, not of right—if so, the same kindness, will, I doubt not, always be extended to them, whenever it shall please God so to afflict the land.' "

If we ask what Hannah More meant by "well-instructed" we find that she was especially gratified with one village, which she took in hand, where a woman had been hanged for stealing some butter, when the villagers "knew tolerably well the first eighteen chapters of Genesis."

The consequence of this materialistic and selfish hy-

pocrisy in the seats of religion was that the hungry sheep who looked up and were not fed rushed, like the flock of sheep they were, in the direction where food was offered. And here in Darwinism was a new church fully equipped with all that they had sought elsewhere and failed to find.

For though Hannah More's miserable villagers stopped short at Genesis, the people of good will and better education, who espoused the cause of the down-trodden, soon found in the new thought a spiritual emancipation from the cruel, selfish, pseudo-religion, which had no help to offer in any of the vast new social and economic problems and scandals of the Industrial Revolution.

In short it was none of Darwin's doing that the people who, unlike himself, were more interested in crude life, than in pure biology, found a religion in "Darwinism." The blame or credit lay with the blind shepherds of established religion, who themselves made the monster they so detested.

Thus the humanistic aspect of science, discussed in the introduction, must be kept fully in mind, if we are to follow the history of Darwinism and evolution in their effect on social life. No branch of science has ever become popular without becoming a religion, and in order to become a religion it has to satisfy the emotional hunger of millions of men. And this is precisely what Darwinism did.

Nor need we read in the history books about Hannah More for our most striking examples of such a feeding of the hungry: we find them wherever economic condi-

tions tinge even the pursuit of knowledge with an economic purpose. Go to a mining village and talk to a self-educated miner and you will find that the gentle pursuit of learning for its own sake, possible though rare in our more leisured, more protected, milieu, means nothing to him. He has a grimmer and more hard-headed purpose than "culture": he wants knowledge which will give him practical help and concrete hope.

For instance, the author was once lecturing in a mining village in South Wales to a group of miners on working-class education: his hosts were two young miners, who had supplemented their scanty schooling with a wide reading within the narrow orthodoxy of socialist literature. In philosophy and science Haeckel was their ideal: they believed that only ignorance, prejudice and bourgeois avarice could possibly deny his infallibility whether in biology, embryology or general philosophy. Why? Because they found in his crude materialist pseudo-scientific outlook the only alternative known to them to the petty cheese-paring philosophy of the local Chapel. The minister told them that everything was for the best; that God ordained that their masters should inherit this earth, but that meekness and submission would earn them a place in heaven. Haeckel told them that heaven did not exist and that they were merely the downtrodden in a struggle for existence, and that their right and duty was to become fit to survive by their own effort.

In short Haeckel appealed to them really because they

got from him a piece of practical advice; but to give that advice validity and sanction it appeared to them essential to believe all that he said even about embryology. To dispute what he taught about ontogeny and phylogeny was to abandon the fight against capitalism, and to deliver over the citadel to the enemy.

No better example could be found than this of our theorem, but it is only one out of hundreds: it is not only the "class-conscious" workers who think of science in terms of religious dogmatism, everyone in the world except a few thousand scientists is guilty of the same failing. And in short, facts lead us to abandon any hope of keeping the scientific study of man free from the interplay of religion, economics, ethics and social aims. Nor could a time be found when this was more inevitable than when Darwinism sprang into the full light of public recognition.

At the moment when the Origin of Species was published all the higher aspirations of the social consciousness, all the enthusiasm, optimism, hope, loyalty, and belief in progress which are usually the servants of the religion of the day were deprived of their natural master because that religion was moribund. Belief in things unseen can only be strong if such a belief answers the needs and desires of the individual experience. Victorian Christianity did not do this and then knowledge of things seen burst upon the world with a new hope: "hence we may look with some confidence to a secure future of great length. And as natural selection works

solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection."

In other words, to the average man the god of the scribes and pharisees worked in so mysterious a way to do good to his creation that nature's plan, with so substantial a promise, was preferable. "Why should I sit still in misery" said Everyman, "trying to forgive God, when nature's plan is that I should get rid of misery and poverty and disease by my own effort?" That nature helps those who help themselves was at once seen to be a scientific truth. Here was hope in a barren land: "the ultimate development of the ideal man is certain, as certain as any conclusion in which we place the most implicit faith; for instance, that all men will die!" The perfect man is part of nature's plan. What then is nature's plan?

In the first place, it is the descent of all forms of life from a common ancestor: What effect had this upon men's minds? Motoring along the road, we come to a corner and see another car coming at right angles: if we believe that providence will regulate the speeds so that no collision will take place, our belief may be justified; but if we decide not to bother providence by asking it to intervene in such a secondary matter, we will use the mechanism of the car to bring about the result necessary for our safety. In so doing we do not in any way lessen our belief in providence, and we do learn self-reliance by trusting to our own abilities; moreover our idea of

providence is purified because we blame ourselves and not it for accidents.

So with evolution and Darwin's theory of common descent: human life as part of life in general is seen to have a larger degree of autonomy; we do not blame Providence for the existence of fleas and mosquitoes; we do not insult the Deity by wondering why He invented the slug, nor insult Him doubly by finding some ridiculous good reason!

In short it was the fault of the fundamentalists of those days that Darwin's great work degenerated into a religious conflict: by refusing to accept it they allowed it to be used as a banner for all their opponents, who grew in numbers hourly through the neglect of their rightful human needs at the hands of these same fundamentalists.

But Darwin is also famous for a second theory which is in no way connected with the first, and this is the theory of natural selection. Let us take by way of an illustration of it the history of the farmer, the cats, the field mice, the bumble bees, the clover crop, the honey bees and the villager's honey.

In a typical English village such as is most often seen on picture post-cards or at the movies, each dear old villager kept as helpmate and consolation a domestic cat, and as supplement to his other sources of income, a hive of bees. Unfortunately the local farmer, losing several head of poultry, outlawed the cats and destroyed them one by one. A few seasons after the extinction

of these poor animals, the honey crop showed signs of failing, but the simple villagers did not of course connect their second loss with their first.

However, the vagrant scientist was more subtle. He showed that during their lifetime the cats had eaten the field mice, and that when they had died, the field mice, robbed of so severe a check on their population, increased and multiplied. In their turn the field mice preyed upon the nests of certain bumble bees, destroying their young; when therefore the cats were killed, the bumble bees had more mice as enemies and their numbers were consequently decimated. Now the bumble bees by flying from one clover flower to another had been instrumental in fertilizing the crop and when they grew fewer the clover was not so satisfactorily fertilized. Since therefore the honey bees got the raw material of their honey from the clover, when the latter grew thinner, the honey grew less, and the death of the cats resulted in the long run in a poor crop of honey.

If we take away the first step and the last—that is, the farmer's gun and the villager's disappointment in their honey crop—we have an example of how nature works, whenever man is absent, and how she worked before man existed. We see different forms of life dependent on one another and destroyed by one another: sometimes two or more forms get on in life by mutual aid, as with the bees and the clover, sometimes they get on by killing one another as with the cats and the mice or the mice and the bumble bees.

But over everything else in this pattern of give and

take, of victim and victor, one great fact casts its shadow —more individuals are born than could possibly find food to support life. Suppose that instead of supplementing their diet with the farmer's poultry and saucers of milk, the cats had only eaten the field mice: only as many cats as could find enough mice to eat could live, the rest would die of starvation and it would be the best mousers who would survive, because they would be the ones to catch the food. In theory the cats might eat up all the mice so that there would be no young mice born next year and then all the cats would have to migrate elsewhere: this would in fact not actually happen because just as the cats were the mice's enemy so some other form of life would be theirs and a balance would be formed allowing for some mice and some cats to escape their enemies and to breed and continue to exist as species. The number of cats in the neighbourhood would be conditioned by the number of mice, only as many as could support themselves on the local mice would remain in the locality, the rest would die or emigrate.

Out of this unceasing melodrama arises one fact, that of all the individuals born into the world only those fittest to survive, will survive. The rest will be weeded out not by the hand of a purposeful gardener, but by the great talons of famine and starvation.

Now suppose that there are two different species of mice: both equally good on an average at finding bees' nests, but one of them less able to avoid their common enemy, the cat. There will be a struggle for existence between the two species, as well as between the individ-

uals in the species, and sooner or later the species which is less able to elude the cat will become extinct.

Or suppose one species of mouse can elude the cat better than the second, but that the second is better at finding bees' nests: perhaps both species will survive, but all the time there will be a hot competition between all the individuals and the fittest in both species will alone be able both to escape becoming cat's meat and also to find food for themselves. Thus the struggle for existence is not only true for individuals but for species; the kinds of life most fit to suvive, will survive, the rest will disappear.

Darwin's second great hypothesis was based upon a collection of thousands of facts such as those described above: and nobody has ever been able to deny the truth of the picture which he draws. A struggle for existence certainly goes on in every field and forest and among communities of men not least; but as we shall see there is one point where later scientists have found it necessary to disagree profoundly with Darwin, and that is in his suggestion that the origin of so many different forms of life from a common ancestor could be explained chiefly in terms of natural selection and the struggle for existence.

The detailed explanation of what science does believe belongs elsewhere but here it is necessary to point out that when the fundamentalist says that "science has had to give up Darwin" and pretends that scientists no longer believe in the theory of common descent of man and

animals, he is either very far from innocent of guile or exceedingly ignorant of the true position.

We are now able to understand why Spencer was so optimistic about man's future: biology taught him to look back upon unending avenues of progress down which life has marched, growing ever more complicated and therefore, in his opinion, "higher" until, out of the inevitable working of natural law, man emerged from the welter of his obscure ancestors. He could establish therefore the inevitability of progress by an appeal to facts. Exactly the same blind force which had delivered him from his simian bondage would lift him above his present obvious limitations. It was full steam ahead for the Millennium.

Unfortunately, however, Spencer and the rest forgot some of the most important facts in the general situation: it was not their fault, for, as we have seen, the spirit of the age, optimistic or pessimistic, materialist or spiritual, unceasingly plays even upon the minds of scientists. We all forget what we do not want to remember. Darwin himself said that whenever he hit upon a fact which did not fit in with his theory he always wrote it down at once, for he noticed that it was those facts that he tended most easily to forget; and so forgetfulness is greatly influenced by the herd-instinct around us and if that instinct tends towards optimism we actively forget whatever is dark in reality. What did Spencer forget?

He forgot that from the human point of view "nature's plan" is not a plan at all and that nature is blind. There

has been evolution, true, but the only way in which evolution can be called progress is by taking the last forms of life and saying they are higher, nobler, better than the earlier: and the only way in which this can be done is by saying that the noblest is necessarily the fittest to survive; that the strong man armed with all the most modern lethal weapons, sitting upon a golgotha of the skulls of all humanity, is the superman. It seems more likely from the standards of culture and civilized thought that the supermen's skulls will be low down in the pyramid of dead bones and the last survivor a monomaniac so devoted to the defence of civilization that he has defended it out of existence.

At any rate either possibility is latent in the idea of the survival of the fittest to survive, and, in short, man's idea and nature's of progress may be very different.

Moreover there was an even more important fact forgotten by Spencer: *man had entirely upset the whole machinery of nature's plan.* True, he had learned how to see the wheels go round, but then he had hurled a stone into their midst and broken them all. Nature's plan had been wrecked by man the meddler, and evolution by natural selection no longer existed; and we must now consider how this came about.

CHAPTER III

MAN THE MEDDLER

Among the Indians of the North-West Pacific Coast there exists a cycle of legends centred about the Raven: he is a culture hero such as is found in many parts of the world, at once the benefactor of man, and a plague to his enemies and neighbours.

In the beginning, say the Tsimshian, man lived in darkness, and the Creator kept sun, moon and stars in a box hanging from the roof of his hut in the sky: Raven at last determined that he would get them for mankind and alleviate their lot by the gift of light, heat, and fire.

So he flew through the hole in the sky and came to the Creator's hut and saw that the Creator's daughter was drinking water out of a bowl. Turning himself into a dead autumn leaf he fluttered in at the window and fell into the bowl at the very moment when the girl's lips were pressing the rim.

She drank the water and swallowed the leaf: soon she was with child and in due course a son was born, a fine baby who grew big and played about the floor of the hut.

Then one day the baby began to cry and refused to be comforted; he sat on the floor and stretched his arms up to the box, suspended from the roof, wherein were the

sun, the moon and the stars; nothing would please him but that he should have this box as a plaything.

At last the Creator lost patience: "O, give the child the box," he said, "if it will keep him quiet a moment." So they gave the baby the box.

Immediately the Raven, for he it was in baby form, changed to his real shape and flew down through the hole in the sky bringing sun and light and fire to mankind.

We have all met the story in some form or another: probably most of us know it from the legend of Prometheus, the hero who brought the arts and sciences to man, first stealing fire from heaven, hiding it in a hollow reed. It is the same story in a different dress, a story which tells a universal and fundamental truth about humanity: a truth which, as we shall see, was not understood by Herbert Spencer, one which must, however, be comprehended by us if we are to understand the problem we have set ourselves.

The story of Prometheus is so deeply moving to the human spirit that it has inspired one of the greatest Greek tragedies, the Prometheus Bound of Aeschylus; one of the greatest English poetic dramas, the Prometheus Unbound of Shelley; and one of the greatest attempts at philosophical music, Scriabin's Prometheus or Fire Music. Let us look at Shelley's Prometheus: here is how the poet described the hero's gifts to mankind:

"And he tamed fire, which, like some beast of prey,
Most terrible, but lovely, played beneath

The frown of man: and tortured to his will
Iron and gold, the slaves and signs of power,
And gems and poisons, and all subtlest forms
Hidden beneath the mountains and the waves.
He gave man speech, and speech created thought,
Which is the measure of the universe;
And science struck the thrones of Earth and Heaven,
Which shook but fell not; and the harmonious wind
Poured itself forth in all-prophetic song,
And music lifted up the listening spirit
Until it walked exempt from mortal care,
Godlike, on the clear billows of sweet sound;—
He told the hidden power of herbs and springs,
And Disease drank and slept. Death grew like sleep."

Such was the service which Prometheus gave to mankind: he took pity on his nakedness and taught him to rise to the level of the gods, and for this he incurred the wrath of the gods and was punished eternally:

"Three thousand years of sleep-unsheltered hours,
And moments aye divided by keen pangs
Till they seemed years, torture and solitude,
Scorn and despair,—these are mine empire;
More glorious far than that which thou surveyest
From thine unenvied throne, O Mighty God!
Almighty—had I deigned to share the shame
Of thine ill tyranny, and hung not here
Nailed to this wall of eagle-baffling mountain,
Black, wintry, dead, unmeasured; without herb,
Insect or beast, or shape or sound of life
Ah me! alas, pain, pain ever, forever!"

Clearly a myth which is found in various forms from one end of the world to the other must have a great significance: and we ask ourselves, what adventure of the human spirit is summarized in the history of this demigod, Prometheus, who gave mankind so much and was so grievously punished by the gods?

In the first place, Prometheus is a personification of the chief quality which marks off man from the beasts: he is invention; that which makes man the one animal which alters its environment to suit its own desires and refuses to be content with what nature gives it and the limitations imposed on it by nature. The legend describes man's outlook on his environment, his ingenuity in face of difficulties, his triumphs over them which only lead to further difficulties: but that is not all; and, before we look closely at this side of Promethean achievement, we must look at the second truth embedded there.

Not only does this legend tell of man's relations with his environment, but of certain of man's relations with himself. For the ample arena within which Prometheus and the gods oppose each other is the human soul and the conflict is the internal one, which goes on forever in man's divided nature. One of nature's children, man, rebelled against his mother, and proclaimed a permanent civil war within his own soul; a conflict between the conservatism, which bade him be an obedient son, and the radicalism, which bade him break away from parental control.

From the moment when he began to use fire he began to *tamper with nature,* and by tampering with nature

he offended that part of himself which remained loyal to nature.

In the world without he brought the whole fabric of evolution and the survival of the fittest by natural selection to the ground in disorder, in the world within he begot conscience, by eating of the tree of the knowledge of good and evil.

History illustrates the truth of the legend at every turn, for no new invention has ever escaped the odium theologicum: the partisans of nature's gods, those who chain Prometheus to the eternal rocks, have always cried out that we must not tamper with nature: "there is no great invention, from fire to flying, which has not been hailed as an insult to some god. But if every physical and chemical invention is a blasphemy, every biological invention is a perversion. There is hardly one which, on first being brought to the notice of an observer from any nation which had not previously heard of their existence, would not appear to him as indecent and unnatural." For example, when daylight saving was inaugurated in England, a few individuals were found to protest against this blasphemous interference with "God's own time," one such spokesman at least having the courage to air his beliefs in the British House of Commons; moreover much of the opposition which showed itself in arguments against its expedience for this or the other concrete reason was mere rationalization of a similar emotional reaction.

Now if this particular example merely serves to make

us laugh at the oddness of human nature, a far graver emotion is aroused, when we consider a similar attitude towards birth control. Here once more instead of a logical and scientific weighing of argument and fact, we are met with the eternal emotional strife: "You must not tamper with nature," cries the conservative part of the human spirit; just as it did when fire was first used, when the plough first cut into nature's breast, when animals were tamed and domesticated, clothes worn, houses built. It does not matter at all what science has to say; plague, pestilence and famine, it may be, are to be our aids; and our path to the moralist's heaven paved with the gnarled and stunted bodies of women and stillborn children; because we must not summon up courage to do what primitive man was brave enough to do scores of times.

Yet nature must surely have been far more menacing and mysterious to the savage, than it can even be to Babbitt!

This internal quarrel, forever waged by contending elements within the human soul, is one of the factors which must always be borne in mind by the scientist who takes as his subject matter man and human society. Such a scientist will always be a Prometheus; chained to the rock for teaching men to tamper with nature; and it will avail him nothing to call it human prejudice, if by giving it a name, he hopes to be able to ignore its existence—a way which science too often has; for the mere existence of prejudice is itself a scientific fact which must always modify the whole problem of what science can do for man. Man would not be man if he ceased

to have his prejudices and we are not interested in his destiny when he ceases to be what he is.

So much for Prometheus and the world within the human spirit; now for Prometheus and the world outside. If Evolution was to progress along the old road, at the other end of which Spencer saw human perfection, it was necessary that the number of individuals who survived should be limited by their having strength, wit and perseverance to surmount the difficulties of their surroundings. If cats no longer needed mice for food they would soon cease to be good mousers: the invention of saucers of warm milk allowed many a cat, who was not strong enough to get her share of mice, to live on and beget degenerate children with her own poor qualities. So with man: the changing course of nature brought it about that by luck and not by cunning man lost certain valuable qualities, and in the exchange, got others even more valuable.

In strength of jaw, or of skull, in mobility of feet and in general muscular endowment man was and is a degenerate compared with an ape: but simply because of some of these debilities his brain expanded and by superior skill small bands of weakly but upright bipeds were able to hold their own in the primeval forest, and feed themselves and their children. The struggle for existence must have been severe what with carnivorous beasts, the rigours of an increasingly bad climate and the handicap of an increasingly weak physique. Numbers were kept down rigorously by the difficulties of procuring food supplies.

Then came Prometheus and man learned the great inventions called agriculture and pastoral industry: instead of grubbing for wild roots and snaring wild animals, man planted seed and reaped crops, tamed animals and ate their flesh. By so doing, he got far ahead in the race for existence, life became easy, nature's checks on population were largely withdrawn. Moreover man began to be emancipated from his early rôle of haphazard wanderer and the arts of agriculture became a prelude to the arts of the home, the village, the stable centre round which alone can a stable civilization grow.

We have evidence that this tampering with nature was not accepted without a struggle: there were fundamentalists in those days too. For instance we find in some African tribes where two groups have blended, one agricultural and one pastoral, that taboos and restrictions prohibit the eating of vegetables on the same day as meat: and this is due to superstitions dating back to the days when the two groups first met in war or peaceful penetration and the habits of one group seemed repulsive and "unnatural" to the other.

When some tampering with nature has become hallowed by long usage it too becomes a part of nature and any change from it is resented as unnatural, impious, a horror to gods and men. Thus with fire: it is almost universal to find even in Europe to-day that at certain religious ceremonies or on certain festive occasions fire must not be kindled by matches but by friction of dry wood: and this last way is thought of as being more sa-

cred than the modern innovation. So too when fire itself was new we may be sure that on religious occasions uncooked food would have to be eaten instead of the newfangled, unnatural cooked meats of a younger and more radical generation. And we can trace a similar superstition in our own highly sophisticated society: when, for example, a special dinner party is taking place, it is a very common custom to substitute candle light for the more efficient, but more modern electricity, which serves for all other than "festive occasions." Perhaps this is a survival of the same customary behaviour as that which prompts the savage to discard matches and return to his traditional tinderbox for special functions. So too a world which long ago adopted soft hats for the wear and tear of the workaday world, returns to glut its conservatism in a tall hat on Sunday!

But in spite of all this, change has proved more powerful than conservatism, the "old order changeth, giving place to new"; and mankind found that in place of the small groups hunting for wild food, there sprung up great tribes and peoples with flocks and herds, gardens and fields: more food meant more people and the earth began to be covered with migrating hosts. The struggle for existence still went on but no longer was it so severe. Life had become easy, its demands did not require so high a standard of physical and mental powers. The gain to mankind is perfectly obvious; for culture and civilization are the only excuse we have for burdening the earth and here were their beginnings; but what of the loss?

From the days when Prometheus gave us the arts with which to clip the claws and draw the fangs of nature we have not evolved at all genetically: our evolution has ceased to be biological and has become purely external to ourselves. It was the things we made, the ideas we thought out, the ideals we invented which thenceforth were to increase our separation from our nearest relatives in the animal kingdom. The only difference between ourselves and the naked savage of a hundred thousand years ago lies in our social inheritance, our experiments and tamperings with our environment.

Moreover what little change there has been in our physiological makeup in the last fifty thousand years has been very distinctly to our disadvantage. We know that the race which lived in Europe at that remote epoch averaged over six feet in height and had a larger average brain than men have to-day, but we know even more than that. There is little doubt that the Promethean gift of fire with the subsequent development of cooking has profoundly upset our natural digestive functions and brought with it a host of new and terrible diseases. The owl in nature likes to swallow its dinner whole, bone, fur, feather and all, and it has learned to throw up neat little packets of all the unnecessary material after it has digested the good parts: if an owl is kept in captivity and fed on butcher's meat, it does not thank you for saving it the trouble of producing the packets of bone and feathers; it becomes ill and probably dies of indigestion. So with man: cooking softens food, destroys teeth, and upsets the digestive tract, and Metchnikoff went so far as to advise the am-

putation of the whole large bowel as a means of doing away with the dangers resulting from cooked food.

The fundamentalists can shake their heads and say that this is what comes from tampering with nature; but they will, in all probability, continue to employ cooks and take the consequences.

Now man the meddler by increasing the food supply increased his own numbers; let us see what this did to evolution and natural selection.

Natural selection has been likened to a sieve which lets through only a certain size of grain: the rest are sifted out and thrown away. For instance, a cat which could only catch enough mice to live on if there were x mice waiting to be caught, would be sifted out if there were less than x mice, and on the other hand more cats would survive if there were more than x mice—more cats and therefore many less expert ones. So when man learned agriculture he increased the mesh of the sieve and allowed more men to fall through and less to be thrown away.

But he did another thing: as he increased in numbers he became crowded for space and adopted more and more a gregarious habit. Now no animals change so slowly as those which live in groups, for among them outstanding individuals with valuable new qualities are suspect: they are feared as possible dangers to the integrity of the herd which prefers a mediocre uniformity to originality. And so the second great factor in evolution, the appearance of valuable abnormal individuals, has always been vigorously discouraged by man.

Prometheus, therefore, has upset evolution at both ends at once, admitting more of the mediocre and less of the valuable new types and tending to a slow decline to safe and soporific lassitude. But there are further factors in this gloomy history. Increased food supply means increased population, but increased population means increased danger of famine. When the first food-gathering man found game growing scarce he had only to move to another tract of country; bound by nothing, he came and went by himself and all places were alike to him. Not so with the food-producing communities, tied to their fields and all the paraphernalia of their settled homes, too numerous by far to find a natural larder if accident deprived them of their own fruits: they were at the mercy of a drought, a late frost, a swarm of locusts, a hailstorm, a fire; advanced indeed they had in civilization but at the cost of increasing lack of security.

Prometheus had thought to make life more certain with controlled crops and stabled herds but out of strength came forth weakness and the human race found danger in the multitude of its children. Life became fuller of culture and civilization, it is true, but fuller also of fear, suspicion, and jealousy.

Instability due to increasing population was the direct origin of wars and warlike migrations. It is not of course true to say that early man was a model of the peaceful virtues, but at least he had less provocation to be pugnacious. As he became sophisticated, prosperous and numerous, life once more ceased to be easy, and he had

to learn the bitter paradox, that more food only ends in more mouths to feed.

We find also that as numbers increased the dangers of natural changes began to exercise a wider effect: Asia for example seems to have passed through a process of drying up, which withered the grass whereon flocks of countless pastoral groups depended and sent men sweeping in hordes east and west in search of greener hills. Where they found settled lands they fought and permeated and penetrated them and changed the course of history.

Gradually mankind has discovered that the gifts of Prometheus have made it a prey to famine, when nature's balance has been upset by untimely flood or drought; to war, when migrations brought rival groups to struggle for one parcel of land; to pestilence, when overcrowded cities and caravanserai gave bacteria and infections the freedom of innumerable huddled human bodies.

Apparently it was inherent in the very nature of things that out of each new advance and victory there came the seeds of a retreat and a defeat: and indeed evolution soon ceased to be synonymous with the progress of man as a species, and an era began wherein one group rose and fell at the expense or before the rise of a second: the progress of humanity as a whole changed to the internecine strife of community with community for food and water.

Even the most enthusiastic believer in human progress to-day has consciously or unconsciously learned to limit the sphere over which this idea of progress extends: if he

is an orthodox Englishman, he means that England is better off to-day than she was in the time of his grandfather—that is why so few Englishmen are optimists; if he is an orthodox American, he means that America is clearly more prosperous than ever—that is why most Americans believe firmly in progress.

As each community armed and organized against the rest, a further stage of degeneracy resulted, or at least a new set of problems arose; for in the course of this organizing, groups within the group possessed themselves of the control of Prometheus' gifts and enjoyed more than their share of the profits from them.

To internecine strife of man with man was added civil injustice and the dangers of real grievances unrighted.

Once more mankind had entered upon a path which was certainly not the path by following which it had risen so high above the animal world. Let us look for a moment again at the cats and the mice: the object of existence for a half-wild cat is efficiency as a mouser, but the thoroughly domesticated cat often owes its preservation to a different set of values; to its beauty of coat, to its sociability, to something outside itself—the anthropomorphic tendencies of its human master; who sees in it the virtues and graces which he wants to find in it; and in consequence there is no reason why a blue Persian cat should be a good mouser, and thenceforward there is no longer any *survival value* in mousing.

In other words man upsets evolution by giving his own values to animal qualities: and a sinister example of this change of values arose from the time when human society

became stratified: the standard of achievement for the individual became a rise in the social scale, an ascent which needed very different qualities from those which had brought about the ascent of man. In short the things which to-day give individuals a high place in the opinion of society are often if not always things which do not help mankind as a whole to progress upward or onward, either biologically or sociologically: and again the things desired by social leaders for the community are often as dangerous and as undesirable if we consider their effect on biological evolution.

Cheap labour for example is valuable to an industrial community; it leads to the building of great fortunes, great fortunes build great buildings, and as man gazes upwards at his hanging gardens and towering mansions he feels himself far above his cave-dwelling ancestors: but cheap labour means also bad housing, and that means bad health, and bad health leads to a degeneracy which undermines the tallest skyscrapers in time.

Let us look at another side of man's development: as we have seen, since the neolithic age all his evolution has gone on outside his body, it has been in the world of ideas and action, which never penetrate the germ cells nor go out from parent to child. Among these ideas have been many which man has regarded proudly as his protest against the cruel laws of nature. Man invented charity and loving kindness: he began to pity, and has ended by almost worshipping, the deficiencies of others. The defective wolf was thrown out of the pack, the defective tiger fell by the wayside and even his solitary mate wasted

no time upon him, but the village idiot has always been in a sense the village god.

Now it is superficial and stupid to complain, as some writers do, that charity, medical care, hygiene and the conception of a duty towards the halt, lame and blind, are a danger to humanity. True, there is a danger from the biological side of preserving and propagating weak stock, but it is by the very act of assuming responsibility for this danger that man has put on humanity. The justification of the beggar and of the defective is that they show how mankind has attempted something more than a mere biological preparedness in the struggle for existence, that a new set of values, of virtues and strivings have been accepted by man as being more important or at least as important as the mere keeping of his powder dry in his fight for survival. Man the meddler, Prometheus, says to himself, I will beat nature with one hand tied behind my back; I can so outstrip my natural enemies that I can afford to carry passengers in the boat; and when Nietzsche or Wiggam complain of the tenderer qualities in man, they are really not so much pointing out the lessons involved in the story of man's descent from the apes, as advocating the descent from man of a later generation of howling, unjustifiable baboons. But we shall return to this in a later chapter, and it is only necessary here to suggest that when man tampered with nature and discovered other ends in life than the mere biological one which satisfied the other animals, he did two things, first, he made life more difficult for himself, and second, he found himself.

If we look at some more specialized examples of human ideas we shall see this lesson more clearly: the Spanish Inquisition was an attempt to preserve what seemed to the ruling group of men most valuable and indispensable to the life of the spirit, and in their determination to save this for their community, they destroyed the community itself. It will always remain arguable that the Spain of Inquisition days was more worthily employed in burning heretics, though by so doing she weakened her stock past redemption, than she would have been in playing for safety in the biological struggle for existence, a possibility which seldom occurs to the historical critic of Spain. But that it would have been better for Spain to have devoted her energies to cultivating the imagination and mental innovations of the heretics, rather than to burning them, is certain; yet that would not necessarily have been playing for safety in the struggle for existence; for every heretic is a potential Prometheus and as such an enemy to nature and a danger to man as a biological species.

In fact mankind says that values exist altogether more important than nature's; that, for example, though it may be pleasant, as an individual, to live to be a hundred, it may be that the cost is too great, and that it is even pleasanter to die at forty worn out in the pursuit of something worth pursuing; that a community may find it better to produce great culture and great philosophers, than big business and fear-haunted generals for ever preparing for war. And all the biologist can demand is that when mankind refuses to play for safety, biologically speaking,

it does at least risk all for things worth the risk. Art, engineering, war, charity, hygiene, clothes, fire, electric light, the institution of property, capitalism, banking, agriculture, steamships, coal mines, cosmetics, birth control, music, medicine, microscopes, fat stock, canning, town planning, all are tampering with nature, all are putting other values before that of struggling to survive: some are good and some are bad in themselves, some good and some bad from the biological point of view, and it may well be that things good in themselves are bad from the biological point of view and vice versa. That is man's real problem.

What then is the present position of the problem? By stupidity we are jeopardizing all the good that comes from Prometheus—that is, all that separates us from the apes; and at the same time we are disobeying all the rules of biological well-being—that is, all that prevents us from being subhuman once again. What we are for good and ill, we are because Prometheus taught us to oppose ourselves to nature, and once we declared ourselves in opposition as an animal species, we burned our boats and had to continue to face the enemy: we can only extricate ourselves from the consequences of our disobedience by disobeying more.

We are now able to see why scientists have so completely changed their point of view about the necessity of human progress and why Spencer and his generation failed to realize that progress and evolution could only be synonymous so long as man was content to be an obedient child of nature, and willing moreover to submit to her

severe discipline and universal punishment. This blindness was due to the way in which everything was prospering; adversity has given us eyes. It is simply one more case of "when the devil was sick, the devil a monk would be"; and, just as the Dark Ages quivered beneath the terror of the rapidly approaching millennium, we tremble at the impending cataclysm, which has been so clearly foretold by the scientific Jeremiahs.

As this is an age of science we go to science for help, but as this is the New Age of Faith we approach the scientist as if he were a priest and we know that whatever he has to tell us we must take on faith. No longer is our salvation a matter of common sense, nor yet of religious doctrine; it is founded upon right thinking about chromosomes, protoplasm, recessives and dolichocephaly, about which we know less than the Man in the Moon. We know that a dangerous age is approaching, we suspect that the scientists know very little for certain and so we grasp in desperation at the straws which pseudo-scientists peddle to us as panaceas.

That is one mood. In another we rise above such fears and laugh at the grim forebodings of gloomy people. Everything is going well and our civilization is soundly founded, it cannot melt away.

Now in the end that may become a justifiable conclusion, in fact it is the only conclusion for self-respecting, healthy human beings; but, as Mr. Lloyd George used to say, our path leads us through terror to triumph and we must emphasize the terror, keep close to the signposts with skulls and crossbones on them, if we are to be sure

that we are going in the right direction. We will then look at the gloomy side from another point of view; and strive to make our conclusions more concrete.

Man has meddled with natural selection and has altered the basic material of evolution and by so doing has risen to a lofty pinnacle in the animal world, but at the same time he has endangered his own balance: the higher from the ground the more likely the fall back to the ground. One thing alone should have made Spencer pause in the midst of his hymn of praise to necessary progress, "the prominent fact of history that every great civilization of the past progressed to a point at which instead of advancing further it stood still and declined, to become the prey of younger societies, or if it survived, to stagnate. Arrest, decadence, stagnation has been the rule." Could there have been a better example of how under the influence of a general spirit of optimism a scientist can fail to see the obvious! Is it at all surprising that our own age, stunned almost by the fall of thrones and dominations, should feel very conscious of this fact?

Apologists for optimism, who believe that optimism is a virtue and pessimism a vice, will react to this depressing picture we have drawn of the effect of Prometheus by saying that after all it is nothing but a theory, a theory, too, brought on, doubtless, as we have suggested, by an overnight debauch at a New Age's celebration: that the best thing to do is to hope for the best and get on with breaking down sales resistance and the inducing of people to buy what they really do not want.

Unfortunately it is not merely a theory; science and

history can point to innumerable specific examples of the collapse of a form of life or of a form of civilization: the rocks upon which Manhattan is built are strewn with the derelict remains of animals which failed to make good in the race for life and have become extinct in consequence: the sands of all the deserts in the world cover the broken fragments of temples to forgotten gods, and tombstones to forgotten kings. What a panorama of derelict human and animal effort meets our gaze if instead of our parochial view of history we take a geological view.

It is salutary for example to realize that if we take the time that man has ruled the earth and add to it the time the apes ruled it before his advent, and to that add the time mammals lower than the apes ruled prior to their advent, the sum total is the merest fraction in comparison with the reign of great reptiles, now far more extinct than the dodos. Dinosaurs, diplodoci, brontosaurs, ichthyosaurs all paid the price for unsuitability in the struggle for existence, the same price as man must pay unless he can surmount absolutely the dangers he himself has so increased and flies away finally to another planet when this is cold, dead and worn out like the moon.

But this is too wide a sweep for us who live only in the present and have the merest sentimental interest in the events of our descendants hundreds of thousands of years hence. Our moral and warning lies beneath the sand of a far more recent time; and perhaps they have never been better expressed than in Shelley's famous sonnet called "Ozymandias":

"I met a traveller from an antique land
Who said: "Two vast and trunkless legs of stone
Stand in the desert. . . . Near them, on the sand,
Half sunk, a shattered visage lies, whose frown,
And wrinkled lip, and sneer of cold command,
Tell that its sculptor well those passions read
Which yet survive, stamped on these lifeless things;
The hand that mocked them, and the heart that fed:
And on the pedestal these words appear:
'My name is Ozymandias, king of kings;
Look on my works ye mighty, and despair!'
Nothing beside remains. Round the decay
Of that colossal wreck, boundless and bare,
The lone and level sands stretch far away."

That was written of Egypt, whose remains have a lively though vicarious existence, after the civilization which made them is dead, simply because they lie in the direct descent of modern culture.

To be as dead as Egypt is not therefore to be quite as dead as mutton; for her ancient kings still have a "story value" in the newspapers of the world; but nevertheless we can find little comfort in thinking of the grandeur of ruined Manhattan under the moonlight of the fourth millennium after Christ and the thoughts of the excavators as they uncover the few stones standing of the temples of a forgotten age of business enterprise. Our minds recoil from the thought and we refuse to believe that a new Ozymandias may be enjoying as unsafe, as doomed a domination in the twentieth as his predecessor in an earlier century.

Yet Egypt is no exception in the grandeur and the terror of her eclipse; worse things have happened to man's proud communities, worse things and more sudden.

Perhaps if we impress upon our imaginations that we build on colossal tragedies we may assure ourselves of building on firmer foundations than if we build on the many-coloured sands of an optimistic theory of human progress. Can it be that after all we may claim to be "regular fellows with a he-man's grasp of modern problems" even though we point to the dishevelled ruins of Babylon and Kish, of Cambodia and Copan, of Karakorum and Khotan, of the grandeur that was Greece and the glory that was Rome; dead civilizations all, but living witnesses to the fact that when Spencer said "always towards perfection is the mighty movement—towards a complete development and a more unmixed good," he was not promising to New York City an immunity from the ruin and damnation which has littered the past with civilizations as great and cultures often far greater, but now hidden in sand or seemingly primeval forest. If New York City survives it will not be in accordance with precedent but as the proud and solitary exception which proves the rule of general decay.

CHAPTER IV

FROM MAGIC TO SCIENTIFIC CONTROL

§ 1

Our new consciousness of impending danger to humanity is in a sense but the reincarnation of something which has always existed in different forms. Ever since man became man and felt that he had a destiny, he has known that that destiny must be controlled. In the course of his long history he has fought an unending battle with fate and tried many ways of getting what he wanted out of life. To-day he is bitterly conscious of his difficulties and searches about for a way of release: in this search our understanding will be greater if we glance for a moment at some of his earlier solutions and discoveries; for even science rises to greater wisdom on stepping stones of dead half-truths, such as strew the fields of history, and truth lies at the bottom of a well full of human tears shed in the struggle to find it.

Sometimes mankind has thought that the control of his destiny lay in his own hands, sometimes it was in the lap of the gods, sometimes it controlled itself and worked by the pathway of unalterable law for his good. But always

he knew that a force, a possibility, existed, which must be controlled by something.

Sometimes fully conscious of the imminence of disaster, at other times shuddering with an almost unconscious sense of doom, how has mankind essayed the control of the universe and the bending of life and nature to his will?

Let us begin at the beginning.

§ 2

Primitive man believes that all the phenomena of nature are controlled by his own direct intervention:

> "If the sun and moon should doubt,
> They'd immediately go out";

said William Blake; but the primitive outlook is that the rising and setting of the sun and moon are dependent upon his good offices and the faithful fulfilling of the prescribed ceremonies. "If I should doubt," he says "the sun and moon would immediately go out." All the manifold network of cause and effect, of the logical working of natural laws, which are for us the warp and woof of our universe are for him non-existent and in their place is a mystical relationship binding all together with invisible, mystical bonds, having their meaning and their justification in himself. Ask primitive man, "Can'st thou bind the sweet influences of the Pleiades?" and he will answer with all sincerity that he can, and that nothing else can.

Thus he controls the universe with the omnipotence of

his own thought and preserves his life and that of his community from disaster by observing the rules, and controlling the invisible and visible forces in accordance with his needs. It will at once occur to the reader that after the wanderings of long ages of endeavor and search the human spirit incarnate in the modern scientist has come back in a sense once more to the savage point of view. Let us therefore examine this point of view a little more closely, and take it as a starting place for our brief survey of our past solutions to this problem.

With the savage, as with the modern scientist, one of the chief problems affecting the future welfare of his social group was the relation between food and population. He knew that famine or drought could destroy his little civilization as thoroughly as any marauding invader. It was therefore his object to avoid them by controlling the forces of nature which brought them about or withheld them according to their whim.

In Australia, for example, we find an elaborate social machinery for ensuring that the food supply should be adequate for the needs of the tribe. This machinery is part of the general institution of Totemism, which is a belief that all the members of a group are the blood relatives, descended from a common ancestor, of all members of some species of animal, plant or natural object. Thus the kangaroo man is own brother to all the kangaroos, he may not marry a kangaroo woman and usually he may not eat a kangaroo: if he does eat one he must accompany his meal with ceremonies and apologies to his poor brother.

Here is an example of how Totemism is used to control the food supply: there is an insect called the witchetty grub, which is a staple article of food among certain tribes. In these tribes there is a witchetty grub clan, the members of which regard themselves as blood relatives of all witchetty grubs, and descended from a common ancestor. At certain seasons of the year the members of the clan make a journey to a sacred place in the mountains where in a cave there lie close together a big stone and a number of little ones. Over these sacred stones, which are symbolical of the grub and its eggs, they perform magic ceremonies and, decorated with magic patterns, dance, and utter mystic words.

By these methods they are ensuring that the grub shall increase and multiply and bring forth abundantly, so that there shall be food enough for all.

A curious detail of the ceremony is that the leader of the clan goes to each of his companions in turn and rubs their stomachs, saying at the same time: "You have eaten much food," the modern equivalent of which would doubtless be, "every day and in every way, your dinner gets bigger and bigger."

This idea of controlling the food supply, through controlling the human appetite, can be found in several primitive communities, and an interesting example comes from the Trobriand Islanders. The Trobrianders are assiduous gardeners and cultivators of yams and when a village gets a particularly fine crop of yams a medicine man is employed to cast a spell over the inhabitants which shall give them a poor appetite.

It may seem curious that this spell should be used when the harvest is good, rather than when it is bad, but the reason is that the Trobrianders are very proud of a good crop, and want it to last as long as possible, so that they may boast of their superiority in husbandry over their neighbours; and often go to the extent of living on wild berries and inferior vegetables, so that their yam houses may remain full of numerous though rotting produce.

These illustrations of primitive magic show that it was the savage's own effort and will which controlled and insured for him the necessities of life, and if we too to-day are beginning to have the same outlook, we have only returned to it after long and devious wanderings in the wilderness where the pillars of fire of the will o' the wisps read "The Lord Will Provide."

Since however most fundamentalists are agreed that we may tamper with nature in so far as food is concerned, let us compare ourselves with the primitive magic-ridden communities in our attempts to control the race and the future generations by means of eugenics. Here too we have to go back to the beginning of human wanderings in order to find the modern idea of human control. Such control, in the eyes of the savage, must be constantly exerted if the children are to grow up strong; disobey the rules, obedience to which brings power to control destiny, and the next generation will be poor fighters, poor hunters, and the manhood of the tribe will decay. In fact the primitive community believes in and practises eu-

genics, and no less so because they happen to be mystical eugenics.

First of all it controls the relations between the sexes: woman, most desirable object of man's environment, is also the most dangerous; to touch her is a pleasure, but also a contamination, and, as a result of this belief, we find that half the rituals and ceremonies comprised in the long history of human marriage are attempts to immunize man from the dangerous contact, which he finds so indispensable to his happiness.

Mystical eugenics, indeed, dominate the whole life and thought of the people; marriage and sexual intercourse are regulated entirely with an eye to the good of the community; every act and interest of ordinary life is influenced for good or ill by the relations existing between men and women. In Africa we find for example that all the operations of smelting iron ore, of mining, and making metal implements are liable to be unsuccessful, if any workman has seen or touched his wife on the days immediately proceeding, has slept on her sleeping mat, or eaten food cooked by her; and in consequence elaborate laws and rules prohibit these things for the good of the community.

All the occupations and labour of men and women are conditioned by the same rigorous standards of control in the interest of society; sex and fertility determine the work which every individual may or may not do. One traveller among the Indians of the Orinoco tells us that: "sowing, tilling, reaping and storing the field products is

all done by the women. I would say to the men: 'My brothers, why do you not help your poor wives in the labour of sowing the fields, for they work hard in the heat of the sun, with their infants at their breasts? Do you not realize that they may fall ill and their children likewise? Come now, come and help them!' 'Father,' they would answer, 'you do not understand these things, and that is why you are troubled about it. You must remember that our women know how to bring forth, and we do not. If they sow the seed, the maize stalk yields two or three corn cobs; the yacca beans a triple yield; and thus everything is increased. Why is this? Because women are able to bring forth, and are able to command the seed they sow to be productive. Let them do the work of sowing then, for we do not know so much about it.' "

There is no end to the examples of savage belief in the omnipotence of human thought that might be given: mystical control settles all problems, wards off all dangers; follow the path which is lawful and right and all will be well with man as an individual and with the community as a whole: but it is indeed a narrow path and "every abrogation of customary usages, everything out of the common is considered the universal cause of whatever misfortune may arise—bad weather, sickness, defeat in war, unsuccessful hunting, and the like. . . . Thus bad weather will not be the result alone of the fact that a corpse has not been cremated; it will also be caused by the natives having neglected to isolate a young girl during the period of puberty; or a young girl has been combing her hair outside the hut; the missionary had put on

his snowboots before leaving the house; the school children in their play had imitated the cries of wild birds; and we ourselves had cleaned the skin of a mountain goat with salt water; moreover we had dragged a dead hedgehog across the snow."

In short the savage believes that it is necessary to control his destiny by careful attention to what he does, that disaster is due to his own folly and that the only sanction for human conduct is the good of the community, that eugenics is a necessary and imperative duty, and that in all ways he must look after his own destiny and that of the community, for destiny will not look after itself.

§ 3

What is the importance of these outlandish ideas to us? How are they relevant to the solution of our problem of scientific control?

In the first place we have to remember that "once a savage, always a savage" is true of humanity; that just as psychology tells us that we forget nothing at all, but that every experience lies hidden within us, ready to be called forth to the light of consciousness by some accident of association, so our cultivated modes of thinking cover, but scarcely conceal, more primitive elements. Magic has its place even among scientists, especially when their attention wrestles with the problems of human life.

Magic gave place, as we shall see, to other ruling ideas, but it persisted side by side with the later ideas, and still

persists to-day. In the middle ages magic kept science alive; astronomy in the form of astrology and chemistry in the form of alchemy, to mention but two instances, owe much to the persistence of the primitive belief in the control of life through magic.

It is, therefore, very important to find ways of distinguishing between magic, the parent, and science, its child: and we will do well to be on our guard against taking one for the other.

In the second place, not only may we find magic masquerading as science, but we must remember that its existence and persistence are proof that magic fulfils a universal human need. Hosts of human beings would far rather be given magic than science, and the demand creates the supply: this explains a great deal which would otherwise be almost incredible in the writings of some of our eugenists.

Finally, if we want to be broadminded we must admit that magic seems in many ways to have been a very efficacious form of control; primitive communities were not altogether immune from catastrophe, it is true, but they certainly were more secure than our modern communities seem to be. Was not this partly due to magic? And is there not a legitimate place for magic among ourselves? We are bound to ask these questions, but perhaps not bound to answer them.

In his primitive solution to this supreme problem, man was too dogmatic: he was guilty of an overstatement and though learning by experience was a slow process, which took ages rather than years, finally he had to admit de-

feat, to admit that human thought, as he was able to exercise it in his early days, was not omnipotent in the universe. Thus came "the birth of humility," parent of the gods, created to take responsibility for man's own failure to control completely his destiny and his environment.

§ 4

The child commands the mountain to move, and the mountain refuses; the child reproves the mountain and tells it that it is "naughty"—and goes to it. It is a confession of failure; the child finds that his will is not omnipotent; mountains also have wills. The spell changes to a prayer.

In some such way the savage becomes conscious of the difference between the ego and the non-ego; for as long as things obey, so long as the right spell, the right mystical connection works with them, they are a part of the ego, as is the food we have eaten: when they refuse to obey, and not until then, they become something outside ourselves.

When the mountain ignores the child's entreaties and remains where it has always been, the child deifies the mountain: regards it as a being like itself, of like passions, but stronger, wilful, and demanding a bargain, a prayer or a sacrifice, in exchange for which it will do what the child wants.

Once begun the process continues and deities multiply; man busies himself diligently with god-making: "from generation to generation, under his shaping hands, the

figures multiply and define themselves; till at last, from the womb of the dark enigma that haunted him in the beginning, there emerges into the charmed light of a world of ideal grace a pantheon of fair and concrete personalities. Nature has become a company of spirits; every cave and fountain is haunted by a nymph; in the ocean dwell the Nereids, in the mountain the Oread, the Dryad in the wood; and everywhere, in groves and marshes, on the pastures or the rocky heights, floating in the current of the streams or traversing untrodden snows, in the day at the chase and as evening closes in solitude fingering his flute, seen and heard by shepherds, alone or with his dancing train, is to be met the horned and goat-footed, the sunny smiling Pan."

Once man had made gods, beings like himself, yet higher, it was but one step to making a being higher also than the man-like gods; and the next solution to man's problem of controlling his destiny after magic had been tried and found wanting, was the solution which we call fatalism. Fate, looming behind men and gods and controlling both alike represents a universal stage and in some senses an eternal state of human thought. The direct antithesis of the savage belief in the omnipotence of thought, remnants of it exist side by side with the earlier doctrine and cause some of the numerous contradictions from which our ideas suffer even to-day.

The idea of fate reached its highest expression in Greek tragedy, where the savage conceit of his own power is strangled by the conception of law, inevitable, irrevocable, binding all men to their destiny. "Whoso-

ever commits all manner of transgressions, and swerves from right, he perforce in time shall lower sail, when trouble has overtaken him, and his yard arms are breaking. Then he calls in his trouble to those who heed him not and strives in vain amid the surge. And God laughs at the man of fiery heart, who boasted that no evil should come nigh him, when he sees him worn with inextricable woes, and ever failing to round the perilous promontory. And he perishes forever unwept, unseen, wrecking his former bliss on the shoals of justice." Thus does Aeschylus describe Fate which is justice, controlling men by the arm of unalterable law. Not only will man inevitably be punished if he breaks the law,—even the savage believer in magic knew this—but the very alternative of just or unjust behaviour is no longer in man's power to choose: "it is an old saying that much prosperity begets misfortune. I hold a creed far apart from this. It is the impious deed which brings forth an offspring of woe, like its parent stock. But the house that loves justice shall flourish from generation to generation." But what of the house into whose history crime has entered?

The most famous series of dramas in the history of literature deals with this very problem; in the history of the house of Atreus we find the man fated to expiate a crime by the commission of another crime, for which he in turn must suffer: a sombre philosophy indeed from which mankind has only partially escaped.

And in so far as mankind has escaped it has been by way of a fuller realization that he need only believe what

is convenient about things unseen, and that just as the idea of fate came to relieve the burden imposed by belief in magic, so when that idea became intolerable he need only imagine a third and be dominated by it, to escape from his self-made chains.

§ 5

The idea of Fate represents both gain and loss in the search for a means of controlling man's destiny: the gain is that man realized at last that there were laws or rules within which he had to move, that forces outside him circumscribed his possibilities and limited his own thought.

> There was a young man who said "Damn!
> I distinctly perceive that I am
> A creature that moves
> In predestinate grooves;
> I'm not even a bus, I'm a tram".

as the anonymous poet naïvely puts it. Man learned his lesson that human thought is not omnipotent: and as we would expect he learned it too well.

When the English author was told of an American lady that she "had reconciled herself with the universe", he replied: "She'd better"; but he ought to have added, "but she'd better not reconcile herself with anything much smaller."

For fate and fatalism are the exact opposite of those ideas which, in the words of mathematical text books, "hold good for small quantities only"; they are excellent

for astronomy, but poor for everyday life. They hold the stars in place and keep the planets circling round the sun, but even if it was already ordained, when the world was part of a nebula, that the reader get typhoid next year, he may as well avoid eating oysters from polluted water beds in the meanwhile.

It is of course true that Law rules the universe but a very great change had to come over human thought before this discovery became useful instead of dangerous: for to the Greeks this Law was ethical and so long as mankind believed that he must not disobey Law, because disobedience was wrong, he was unable to see that he could not disobey Law, because disobedience was impossible: and this was the great lesson which was needed to temper the arrogant but valuable conceit of the primitive.

§ 6

The curate had to entertain the archbishop and was of necessity nervously anxious to impress him with the geniality and propriety of his conversation. "I feel sure that you will be interested, your grace, in what has just happened to an aunt of mine; she had arranged to travel to Scotland by the express train which met with that terrible accident, but at the last moment she decided to put off going for twenty-four hours; now do you not agree with me that that was a wonderful example of the kind dispensation of a merciful providence!" To which the archbishop replied, "Can't say, never knew your aunt."

The transition from magic to fate was a necessary step, as we have seen, in the education of man, though it involved a loss as well. In so far as he forgot the conception of control it was a backward step, for though his practice had been far from perfect, the conception itself had been excellent: all he had needed was to learn to use his reason and to discover logic.

But the step from an immobile fate to a providence credited with beneficent intentions was even more retrograde: for whereas fate was not controlled because it was useless and dangerous to try to control it, providence was not controlled because it was unnecessary to control it: the slave in the one case did not revolt because he could not, but in the second he did not because through being a slave, he had lost all, even the desire to escape from slavery. Prometheus could revolt and find human beings ready to follow his rebel standard against Fate, but what could he do against a beneficent providence; who was likely enough to kill us rapidly by snake bite to-day, in order to save us from a lingering and more unpleasant end next week?

Needless to say the idea of providence held by St. Thomas Aquinas was by no means so vulnerable as that held by the curate: but we are dealing with mentalities on the curate's level and not with the exceptional intellects: ordinary folk populate and rule the world, and of them the curate is more typical.

Moreover we find that although "The Lord will Provide" and "God moves in a mysterious way His wonders to perform" are on the lips of all Christian congrega-

tions, nevertheless some attempt at control is orthodox and universal to Christianity. For the completest belief in a beneficent providence we have to look elsewhere and in Africa.

A Christian missioner in Africa reported the following experience: he noticed that the Negro gods, to whom their prayer and sacrifice were offered, were of uniformly bad character and so he asked the natives,

"Do you have no conception of a good god?"

"Why certainly," he replied, "of course there is a good god as well as all these evil ones."

"Then how is it that you do not pray to him also?"

"Pray to a good god! what would be the use? as he is good he gives us what we want without prayer and we pray to the bad ones so as to stop them being bad!"

Clearly, however, providence is an attempt to reconcile the concept of human omnipotence and fate: for providence is a "magnified non-natural man" wielding the omnipotence of fate; it is unlike the earlier gods because they represented the whole man or the personification of one or other of his passions, whereas providence is a man with the power and stability of fate, and a fate with the interest in human kind which only a superhuman, rather than a non-human being, could have. "Superhumanus sum, ergo nihil humanum a me alienum puto" is blazoned on the shield of providence.

As with magic and fate, the idea of providence at once helped and hindered man in his fight for control of his destiny. Man has two different things with which to contend in the domain of being frightened; phobias, such

as fear of the dark, and true fears, such as fear of venereal disease. Belief in providence is of great value with the first of these, and guardian angels are assets of incalculable worth to parents when children's bedtime comes; but if a man believes that providence gives bad people venereal disease as a reward for their badness, such a belief in providence is clearly dysgenic and unhygienic, and a menace to the community. Yet no one can pretend that such a frame of mind is not common.

That the scientist must admit the social value of providence in time of stress is certain: the late war furnishes innumerable examples, as when a mother said: "My son's life has been spared by a dispensation of merciful providence; there were twenty-six men in the trench when the bomb burst, and he alone of the twenty-six was left alive." It speaks well for the faith which is in us that the other twenty-five mothers would probably not have found anything incongruous in their more fortunate countrywoman's statement.

Nevertheless scientists must protest against the constant dragging out of the idea of providence, like a well-worn stage property, whenever the human comedy has suddenly changed to tragedy, not through the machinations of a deus ex machina but because of the ineptitude and ignorance of the human actors themselves.

Providence is too much imbued with the arbitrariness of its creator, man; and is too complacently willing to be a scapegoat for his futilities, to be a sure guide or a firm defense in the struggle for human existence. Moreover, as we have seen earlier, the ideal of providence was

not powerful enough in men's hearts to be able to withstand what people like Hannah More did to it. Subservient to things as they are and the powers that be, it gave way before the anger and contempt of the Industrial Revolution and the idea of progress reigned in its stead.

§ 7

In 1889 Frederick Harrison delivered a famous lecture on "The New Era" in which he told his audience that the belief in "celestial rewards of the separate soul" had been replaced by a "faith in human progress." We have already studied the birth and effect of this idea.

Magic, fate, providence, progress through evolution—such have been the stages along the road and all we have to do to complete our sketch is to mark the fall of the last of these partial human dreams.

As we have seen, the scientific theory of evolution could have given rise either to a religion of optimism or to one of pessimism, it could have answered the question "Is progress certain?" either in the affirmative or in the negative.

"In an age of prosperity," says Professor Bury, "and self-complacency, the affirmative answer was readily received, and the term evolution attracted to it in common speech the implications of value which belong to Progress. It may be noted that the complacency of the age was promoted by the popularization of scientific knowledge. A rapidly growing demand (especially in England) for books and lectures, making the results of

science accessible and interesting to the lay public is a remarkable feature of the second half of the nineteenth century: and to supply this demand was a remunerative enterprise. This popular literature explaining the wonders of the physical world was at the same time subtly flushing the imaginations of men with the consciousness that they were living in an era which, in itself vastly superior to any age of the past, need be burdened by no fear of decline or catastrophe, but trusting in the boundless resources of science might securely defy fate."

In an age of optimism founded on material prosperity the oracle when sounded gave an optimistic answer: and we are tempted to compare the outlook in America over popular science to-day with that described above.

Is it not true that America is passing through a similar period of prosperity, if not of self-complacency, and that in consequence Americans refuse to "be burdened by fear of decline or catastrophe"? And is not that why American newspapers are crowded with the most ridiculous articles of a pseudo-scientific nature suggesting that we have already solved the problems of humanity arising out of the meddling of man with nature's plan?

Here is an interesting example of the interplay between European and American thought: Europe has long ago given up the dogma of progress as a necessity following on evolution, but being largely given over to a very natural pessimism has not affirmed another optimistic doctrine in its place; America has accepted the rejection of the old ground for optimism but has gone one further and found a new basis. Her popular writers do not echo

Huxley's words: "progress towards perfection is inevitable, always towards perfection is the mighty march," instead they affirm, "the proper study of mankind is drosophila, and through what we have already learned about guinea pigs we shall produce the superman."

In 1918 Professor Bury wrote: "Will not the process of change, for which Progress is the optimistic name, compel 'Progress' too to fall from the commanding position in which it is now, with apparent security, enthroned? A day will come, in the revolution of the centuries, when a new idea will usurp its place as the directing idea of humanity. Another star, unnoticed or invisible, will climb up the intellectual heaven, and human emotions will react to its influence, human plans to its guidance. It will be the Criterion by which Progress and all other ideas will be judged. And it too will have a successor.

"In other words does not Progress itself suggest that its value as a doctrine is only relative, corresponding to a certain not very advanced stage of civilization; just as Providence, in its day, was an idea of relative value, corresponding to a stage less advanced?"

Even as he spoke his words were actually being fulfilled, for another generation broken by war and disillusioned by the barren peace and the still more barren future was coming intellectually to the front, and colouring the philosophy of the hour. In its mouth the question of progress was answered in the negative and an outlook of pessimism reflects the hopeless economic and social inheritance of foundering Europe.

But in America all is well; whether in Miami or in California, in Chicago or New York, prosperity gives immunity from all the germs of pessimism and the popular scientists find a ready sale for their pæans of praise about the infinite possibilities of eugenics, race feeling, heredity and the rest.

The new idea has already been born, the new star induced to shine, and Bethlehem is in the U. S. A.

This new idea is progress not through blind nature but through clear-sighted, scientific control.

§ 8

Round the corner then from Professor Bury's gaze lay the idea of control, the belief that mankind can only save itself from the consequences of meddling with nature by more meddling.

Now part of the purpose of this book is to show that at present control is an object not an achievement, not a fact but only an idea: moreover it will have at once occurred to the reader that it is an old idea at that.

It is the primitive outlook of the ultimate omnipotence of human thought over its environment chastened by the spiritual experiences of fate, providence and progress: a veritable case of using dead ideas as stepping stones to higher things.

The primitive idea of magic failed because it lacked the logical processes of thought and the empirical method which it needed: out of its corpse grew the idea of fate, born of humility: fate was humanized into providence:

the follies and shortcomings of providence were borne on the ampler shoulders of evolutionary progress, the law of necessary waste and suffering: this last was purged of the lingering remnants of fate and providence and the residue proves to be—what? The belief that man must become omnipotent, master of his fate, almoner of his providence, guide of his own evolution, controller of his household, the world, and of its master, himself.

The question we have to ask ourselves is this: When scientists give us very good reason to fear lest the human race is doomed to "gradual decay as its arts and sciences slowly fossilize, or peter out, in an overwhelming flood of feeble-mindedness"; and we answer that we must and can save ourselves by the exercise of scientific control, are we merely tying a pious ejaculation to the tail of a terrible threat, and if not, what is the basis of our belief that such control is possible?

When the primitive rubbed his stomach and said "I have eaten much food," he believed that he was controlling his environment: when Canute bade the waves turn back rather than wet his feet, he believed he could control his environment; when the medieval alchemist looked for philosopher's stones, he was aiming at the control of his environment; and what of the modern eugenist?

When we seek relief from our uneasiness by murmuring the word "eugenics," are we really doing more than the old lady who got relief from murmuring, "that blessed word, Mesopotamia"? Is eugenics just the new name for the medieval elixir of life, likely to make the modern

alchemist look as foolish now as his forerunner in the middle ages, though far less picturesque?

And we must ask ourselves whether eugenics, scientific control of human passions for the benefit of human futurity, has been tried before and if so what lessons can be learned from these trials.

Take for example the case of Sparta. What are we to make of this?

"The production and rearing of children instead of being left to the caprice of individuals, was controlled and regulated by the state. The women, in the first place, were trained by physical exercise for the healthy performance of the duties of motherhood, they were taught to run and wrestle naked, like the youths, to dance and sing in public, and to associate freely with the men. Marriage was permitted only in the prime of life; and a free intercourse outside its limits, between healthy men and women, was encouraged and approved by public opinion. Men who did not marry were subject to social and civic disabilities. The children as soon as they were born, were submitted to the elders of their tribes; if strong and well formed, they were reared; if not, they were allowed to die. At the age of seven the boys were taken away from the charge of their parents, and put under the superintendence of a public official. . . . Nothing was omitted, on the moral or physical side, to make them efficient members of a military state. The whole city was a camp. Family life was obliterated by public activity."

Are we capable of reproducing such control as that?

Is there any part of it which we can produce? How far has modern science brought nearer the possibility of such control?

And supposing that we answer these questions optimistically, what then? Have we hoed to the end of our long row? Sparta instituted a control which was not based upon our scientific knowledge, it is true, but which was nevertheless far in advance of primitive magical control; was it successful? What happened to Sparta?

"The constitution devised for a small state encamped amidst a hostile population broke down under the weight of imperial power—the power and wealth she had won, at a stroke alienated her sons from her discipline. Generals and statesmen who had governed like kings the wealthy cities of the east, were unable to adapt themselves again to the stern and narrow rules of Lycurgus. They rushed into freedom and enjoyment, into the unfettered use of their powers, with an energy proportional to their previous restraint. The features of the human face broke through the fair but lifeless mask of ancient law; and the Spartan, ceasing to be a Spartan, both rose and fell to the level of a man." [1]

Has the eugenist forgotten that we too have risen and fallen to the level of a man? How can our modern ideas be reconciled to control such as is needed? How far can these ideas be changed and, if they can be changed, by what force of law or public opinion?

Whatever the answer to these many questions one fact

[1] The quotations are from G. Lowes Dickinson's "Greek View of Life."

stands out with irrefutable clarity: science is going to interfere more and more with practical politics and social conduct: whatever solutions men advocate for the pressing problems of the day, they will attempt to justify them by appeals to science. The most sacred and the most urgent duty of all scientists has therefore become to safeguard science from perversion in the interests of faction or human prejudice.

It is a real danger and we propose to illustrate it at length before returning once more to the questions we have asked here, and trying to answer them or at least to estimate the chances of their ever being answered in the future.

We must start with a clean slate; muddled scientific thought is at least as dangerous as no thought at all: let us begin by rooting out the pseudo-science which is making a mockery of the truth in America to-day.

PART II

FALSE PROPHETS

INTRODUCTION

LEMUEL GULLIVER, who was as careful as an observer as he was rash as an explorer, was astonished to find a kingdom divided into factions on the question whether an egg should be broken at the broad end or the narrow end; he would have been quite as astonished doubtless to find among ourselves an equally heated argument as to the relative merits of a broad human head and a narrow one.

In both cases however it would be necessary to burrow a little deeper and to regard the points at issue as mere symbols of some deeper grounds for dissension. If for example the question of which end of an egg should be broken had been a mere matter of personal psychology, a difference of individual taste, and no more; then there would not have been enough social friction to generate the inordinate heat of which Gulliver tells us. But as this heat certainly was generated, we are led to conclude that something else lay behind; that egg breaking in a special manner had become the standard or symbol of a special class in society; that those with an income of more than five thousand dollars broke the thick end and those with a smaller income the thin; or that those who could appreciate Stravinski and the American Mercury did one thing, while those who only read the less intelli-

gent press, the other; or that college graduates, or oil kings, or people on the B's visiting list or what not, regarded the alternative to their own method as the mark of the beast.

Then everyone would desire to prove their method of egg breaking the true mark of aristocracy and, by remembering the rule, parvenus would hope to become worthy, for example, of kissing the hand of a grand duchess.

In precisely the same way people will desire to prove that their head shape, or eye colour, or accent, or table manners are superior to those of other people, and as this is a quasi-scientific generation they will ask backing of science to prove that they are the chosen people, just as their forefathers in a quasi-religious age went on the same quest to the Bible.

There are three social prejudices, which exercise constant pressure on the average man's thought; colouring it, and making it irrational: they are, first, "my country, race or nationality are better than the other man's"; second, "my class, social caste, or social habits are better than the other man's"; and, third, "my moral code, religious outlook, guidebook to heaven, are better than the other man's."

In the old days, for example, if an Englishman found that he had nothing in common and no sympathy with a Brahmin, he said he had no use for niggers and left it at that; and most people forgave him his very human failing of race prejudice. But, nowadays, thanks to the great advances of popular science, he is ashamed to leave

his prejudice naked for all to see and seeks to cover it with a sort of scientific synthetic figleaf composed of words like dolichocephalic, brachycephalic, Nordic, miscegenation and the like. Thus to the homely and pardonable vice of race prejudice is added the far more dangerous and corroding vice of intellectual snobbishness.

Again we find pseudo-science called in by the partisans on each side of the incessant class war, which goes on in our midst, between the incompatible aims and ideals of our social classes. In the old days Hannah More invoked the dictates of religion in the interests of law and order and things as they are; exploited workers must remember that their duty was to be grateful and submissive in the "state of life to which it hath pleased God to call them." Nowadays chromosomes, genes, germplasm and dominant Mendelian characters do precisely the same work. Once more psuedo-science prepares a synthetic figleaf to hide the nakedness of class prejudice and the petty irrationality of the uneducated human mind.

It is interesting to note that the other side in the social conflict stole a march on the upholders of our established social system, so far as the use of science in civil polemics is concerned: for although the "radicals" proved their case from evolution a generation and more ago, it is only of late that the reactionaries and the vested interests have seen what golden use they can make of heredity and the Abbé Mendel. Indeed it is one of the best jokes which a scientist can enjoy to-day to trace the unexpected venom produced by, say, Dr. Paul Kammerer's claim to have induced spotted salamanders to reproduce an ac-

quired modification of their spots, to its origin in a profound belief in the efficiency and inevitability of the capitalist form of production; but of course Dr. Kammerer is in part responsible for this venom because on his side he finds support for a socialist form of production in this very inheritance of changed salamander spots.

The reader is to be pardoned if he does not find the above paragraphs any too clear to him, for they are in a sense rather a summary of the following chapters than an introduction to them. We are indeed about to examine at length some typical examples of synthetic figleaves.

It is however to be first noted that this figleaf peril is not merely a constant factor in human life everywhere and always, but pre-eminently a peril for this generation and for America. Prejudices are universal, and as common in Bulgaria, Paris or London as in New York or Dayton, Tennessee; but this method of dealing with them has never before been so common as to-day nor anywhere else as in America. Why is this? Perhaps an alien may be able to explain.

Like Athens, America is bursting with energy and forever seeking after something new, but in this search America adopts precisely the method which to an Athenian would appear dangerous and impossible. It is the avowed purpose of American public opinion to bring education and culture within the reach of everyone: an idea which had already occurred to Aristophanes as the very best material for a comedy. Now the basis of an Aristophanic comedy is to make us laugh, by showing us on the

stage, what would certainly make us cry, if we saw it about us in actual life.

Culture flourished in ancient Athens, and remained culture in spite of its success, simply because Athens vigorously excluded the Attic equivalent of our "movie public" from all participation in it. America decrees that culture is for the movie public, that in fact Americanism means a cultured movie public. It is not surprising therefore that culture has had to step down in order to raise the millions up to the height of her pedestal. And in so doing science, for example, shows a tendency to forgive loss of accuracy, if gain of a somewhat superficial clearness results.

It is indisputable that America has adopted a higher ideal than any other community of the past or present in her effort to democratize the opportunities for education, but it is out of this very ideal that there arises the possibility of reading in an important daily paper such things as the following:

SEEK SEX SECRET IN BREAD MOLD

Scientists Aim To Solve Wayward Girl Problem

Dr. Albert Blakeslee, vice-director of the experimental evolution station at Cold Springs Harbor, Long Island, which is a part of the Carnegie Institute, who is in Buenos Aires collecting bread mold, expects his investigations to show inheritance is the basis for the waywardness of girls. He said the gifted Russian scientist, Miss Satin, a cousin of Rachmaninoff, is assisting him in the United States in studying males and females

in bread mold, where nine hundred races and species have been discovered.

"It is possible in this simple form of life to observe the laws of life as they govern not merely plants and lower animal life but higher animals and man," Dr. Blakeslee said to-day. "We don't even know as yet what sex is; neither is the basis of sex attraction known, although in our opinion it is chemical.

"We are making a study of the chemical differences between the two sexes in two bread molds which are perfectly adapted for this research in that there is no purely nutritive difference between the two, which is the case in most forms of life.

"In the bread mold the two sexes grow together. The sexes unite and produce embryos and the offspring apparently are nourished by both sexes. Because of this we feel there are important differences. We find that male and female bread molds have a fundamental significance.

"The committee for the investigation of sex problems is a part of the national research council of Washington. While formerly inclined to regard the wayward girl problem from a purely sociological standpoint, the committee is now giving us support, realizing that our investigations into fundamental laws governing sex matters will have a deep moral significance.

"We are experimenting considerably with jimson weed, using greenhouses to get four generations a year. No other plant breeds so rapidly. Dr. Davenport, the director of the Cold Springs Harbor station, is interested in the question of human inheritance as regards stature, diseases and insanity. We know that in the jimson weed cells the inheritance factor, called chromosomes, determines whether the flower is to be purple, long or short petaled or thorny. It looks as if evolution comes through changes in the chromosomes.

"We have already met with such success that we believe we

will soon solve the riddle of evolution. Other scientists are experimenting with different forms of life, with the object of solving the sex problem."

Every day, hundreds of newspapers explain to their readers the marvels of science as accurately, as clearly, as sensibly as that: no better, no worse; yet the generation which eats such mental pabulum gladly and without quaking about its mental digestion, goes to all lengths to sterilize, pasteurize and in general bowdlerize its milk, bacon, water, bread lest an irrelevant germ play havoc with its corporeal stomach.

No wonder that a pseudo-scientific figleaf is quite enough to hide prejudice and untruth from the simple, gullible public, breast fed as it is by that maternal octopus, the modern press. Panem et circenses has given place to panem et scientiam as a means for keeping the public quiet and content with being gulled.

Universal education may be America's chief glory, it is certainly one of her chief dangers for, unlike worn-out, effete and disillusioned Europe, America never stops short before action. Let any quack scientist or real scientist write a book, or propound a theory in England to-day, we are too tired even to turn a head and listen; but here in America you will exact half a dozen laws and subsidize a score of experiments on the very day of publication. You know that science must be invoked if government is to be sane, and you are afraid of being found deaf to her voice when she answers your questions.

And many people look to you now as in past genera-

tions as to a country where prejudices and oppressions are treated as snakes were in Ireland by St. Patrick; they pray that the passion for scientific knowledge and scientific action will not be spent in the manufacture of synthetic figleaves.

It is therefore in a spirit of conscious jealousy that a European experiences for the first time your immense energy and passion for science and when this jealousy turns to undiluted admiration, he is the more disturbed and disappointed by the un-American spectacle of your Madison Grants, your Lothrop Stoddards, your Wiggams and—we confess it—*our* William MacDougall.

Let us then dwell with some of these for a moment, taking a look in also at that odd and uninspiring figure, William Jennings Bryan, who represents an older enemy of the truth, anti-science, no better and no worse than pseudo-science, its more modern ally.

CHAPTER I

THE RACE FIENDS

Behold, my child, the Nordic man,
And be as like him as you can;
His legs are long, his mind is slow,
His hair is light and made of tow.

And next him is the Alpine race,
Oh what a broad and brutal face,
His hair is dark, his skin is yellow,
He is a most unpleasant fellow.

And then the lowest race of all,
Mediterranean we call;
His hair is crisp and even curls,
And he is saucy with the girls.

Hilaire Belloc.

No problem is more clearly of interest to Americans than the problem of race difference and race prejudice. Not only does the presence of millions of coloured citizens with their past history of conflict complicate much of political and social life, but also the promise of freedom and opportunity with which America used to beckon to the old world has accumulated many more millions from all the

races of Europe into the large towns and broad acres of new states.

It is not surprising therefore that the difficulties of living together in harmony with men and women of many different outlooks, traditions and ideals have produced an abundance of that very human failing, race prejudice.

We always dislike anything that is different: for example, an Englishman coming over to America for the first time notices with disfavour that Americans use their knife and fork at table quite differently from the way he has always been taught was right. The American cuts up his meat, lays the knife down, and proceeds to eat his dinner holding only his fork in his hand: the Englishman holds both knife and fork at the same time, or puts them both down, never does he put the knife away in a far corner and eat with fork alone.

Now the conservative Englishman finds the American habit very strange indeed, in some cases he goes still further and finds it reprehensible. In the same way the conservative American finds the English habit strange and reprehensible, and each criticises the table manners of the other to his fellow countrymen; paying not the slightest attention to that excellent precept, "judge not, that ye be not judged."

Or take another example: if an Englishman goes to Spain he finds that most of his neighbours shave only on Saturday; as the week progresses a darker and scrubbier hue suffuses their chins and cheeks and then the whole village repairs to the barber and prepares for the coming festive day. This shocks a very deep English prejudice

and he writes home to his relatives lamenting that the Spaniard never washes.

In all these little details of everyday life our instinctive reaction to the thing which is different from our own habit, is that it is inferior; and not only that, we are sure that the man who acts so must in every way be inferior to ourselves. That is a natural and universal outlook, which men only learn to control as they rise in intelligence and become less animal. In its largest development such prejudice takes the form of a belief that the whole of one's own civilization is and must be superior to any other civilization that has ever existed. For example few of us would suppose for an instant that the civilization of the "heathen Chinee" could ever be compared favourably with our own: but our assumption leaves out the Chinaman himself. The following is part of the reply to the British ambassador who was sent in 1793 to acquire new trade facilities in China: the Emperor Chien Lung refused his mission in these words:

"If you assert that your reverence of our Celestial Dynasty fills you with a desire to acquire our civilization, our ceremonies and code of laws differ so completely from your own that, even if your Envoy were able to acquire the rudiments of our civilization, you could not possibly transplant our manners and customs to your alien soil. Therefore, however adept the Envoy might become, nothing would be gained thereby.

"Swaying the wide world, I have but one aim in view, namely, to maintain a perfect governance and to fulfil the duties of the State; strange and costly objects do not interest me. I have no use for your country's manufactures. It behooves you,

O King, to respect my sentiments and to display even greater devotion and loyalty in future, so that, by perpetual submission to our Throne, you may secure peace and prosperity for your country hereafter.

"Our Celestial Empire possesses all things in prolific abundance and lacks no product within its own borders. There is therefore no need to import the manufactures of outside barbarians in exchange for our own produce."

"No one," comments Mr. Bertrand Russell, "understands China until this document has ceased to be absurd"; nevertheless it is human nature that the American colonists, quarrel with George III as they might, would certainly have regarded the claims of a Chinese emperor even to a partial equality, as absurd. Since the Chinaman does not wash and lives on a handful of rice a day, he is manifestly inferior racially.

Now in America this race prejudice, an integral part of human nature, has loomed large, as we have already seen, because of particular problems: and a very great attempt has been made to whitewash it and to turn it into something respectable.

Surely science can give us a very good reason for disliking coloured people?

Cannot science tell us why we must stop these Jews, in the interest of something higher than money, from competing with us, when we know that by the diabolical cunning of their race, they are sure to beat us otherwise?

Does not science show that all these Italians, Poles, Slavs, are menaces as well as competitors in our daily life? To the worshippers of mammon certain foreigners have

proved dangerous, and science is called in to prove that they should be excluded in the interests of God.

But what has science to say about race? As often when science has been asked to prophesy so that a prejudice may become respectable, here also science turns out to be a Balaam.

If the reader turn to Part III he will find exactly what science does say about race, and it will only be necessary here to quote one sentence from Professor A. C. Haddon's book, "The Races of Man":

> "Race names, such as Nordic or Alpine, are merely convenient abstractions helping us to appreciate broad facts. A race type exists mainly in our own minds. There is no such thing as racial culture."

In the light of that statement let us see how fools, in the persons of Madison Grant and Lothrop Stoddard, have rushed in where angels fear to tread.

In 1916 Mr. Madison Grant published a book called "The Passing of a Great Race." It met with great success and was read by tens of thousands of people, and President Roosevelt himself decorated it with a praiseful sentence, which the publishers gratefully used on the front jacket. Yet in spite of such high praise the fact remains that the book does not contain one single new fact or theory, nor is its method of description in any way clearer, simpler or fuller than a dozen other previous books on the same subject. But it had the great merit in the public eye of giving an apparently scientific basis to a group of popular prejudices.

It sought to show that in America the Nordic race was being menaced by immigrants from southern Europe; that history proved the supremacy and superiority of Nordics and that unless something was done quickly America would fall to pieces because of the degeneracy of her population.

"As a result of certain religious and social doctrines," says Madison Grant, "now happily becoming obsolete, race consciousness has been greatly impaired among civilized nations, but in the beginning all differences of class, of caste and of colour, marked actual lines of race cleavage.

"In many countries the existing classes represent races that were once distinct. In the city of New York there is a native American aristocracy resting upon layer after layer of immigrants of lower races, and the native American, while, of course, disclaiming the distinction of a patrician class, nevertheless has, up to this time, supplied the leaders of thought, and the control of capital, of education, and of the religious ideals and altruistic bias of the community."

This dominant class belonging to a higher racial type is his great obsession: in consequence he hates democracy and all its works: "in the democratic forms of government the operation of universal suffrage tends toward the selection of the average man for public office, rather than the man qualified by birth and integrity. . . . In America we have nearly succeeded in destroying the privilege of birth: that is, the intellectual and moral advantage a man

of good stock brings into the world with him. We are now engaged in destroying the privilege of wealth; that is the reward of successful intelligence and industry, and in some quarters there is developing a tendency to attack the privilege of intellect and to deprive a man of the advantages of an early and thorough education. Simplified spelling is a step in this direction. Ignorance of English grammar or classic learning must not be held up as a reproach to the political and social aspirant."

Not content even with so violent an attack upon the underlying ideas of the American Constitution he attacks with equal violence the great bulwark of modern American social thought, popular education: "There exists to-day a widespread and fatuous belief in the power of environment, as well as of education and opportunity to alter heredity which arises from the dogma of the brotherhood of man, derived in turn from the loose thinking of the French Revolution and their American mimics. Such beliefs have done much damage in the past, and if allowed to go uncontradicted, may do much more serious damage in the future. Thus the view that the negro slave was an unfortunate cousin of the white man, deeply tanned by the tropic sun, and denied the blessing of Christianity and civilization, played no small part with the sentimentalists of the Civil War period, and it has taken us fifty years to learn that speaking English, wearing good clothes, and going to school and to church, does not transform a negro into a white man. . . . We shall have a similar experience with the Polish Jew, whose dwarf

stature, peculiar mentality, and ruthless concentration on self-interest are being engrafted upon the stock of the nation."

He believes quite simply that there is an aristocracy which is at once racial, intellectual and financial and that all attempts to curtail its privileges are the jealous snarls of dirty dagos of inferior race, and because of racial inferiority intellectually inferior, and because of poor intelligence justly poverty stricken. For example, "In the French Revolution the majority, calling itself 'the people,' deliberately endeavoured to destroy the higher type, and something of the same sort was, in a measure, done after the American Revolution by the expulsion of the Loyalists and the confiscation of their lands"—if the author were a daughter of the revolution he would "larn" Mr. Madison Grant to be a pseudo-scientist for this last statement, but as it is, it suffices to quote the sentence to show how honestly 100% Mr. Grant is in his views and prejudices.

Nor is Mr. Madison Grant essentially an American phenomenon: he is a psychological type common to all countries; and however displeasing it may be to Mr. Grant to think of it, there is little doubt that a traveller in Constantinople would find Turks who would accept all that he says with appropriate substitutions as a solution of Turkish problems: it would not be the Nordic race, of course, but it would be the race of the Turkish speaker, and that comes to the same thing.

In England too there was Mr. Mallock, in whose Memoirs occurs a passage so spiritually akin to what we have

quoted as to make it worth while adding it. Mr. Mallock, archconservative and reactionary, had, as a child, a governess, who "sedulously confirmed and developed" the impressions already formed by an aristocratic infancy; she had two bases for her philosophy: "one being the postulate of the divine right of kings; the other being her interpretation of the victory of the Normans over the Anglo-Saxons. She taught us that the population of modern England was still divided, so far as race is concerned, precisely as it was at the time of the completion of the Domesday Book; that the peers and the landed gentry were more or less pure-blooded Normans, and the mass of the people Saxons; that the principal pleasure of the latter was to eat to repletion; that their duty was to work for, that their privilege was to be patronized by, Norman overlords and distinguished Norman churchmen; and finally that of this Norman minority we ourselves were distinguished specimens."

Let us for a moment imagine ourselves to be citizens and scientists under the protection and tutelage of Pallas Athene, the grey-eyed goddess of ancient wisdom. Socrates is sitting in a corner of the market place surrounded by a group of men, among them Madison Grant, Lothrop Stoddard and ourselves. One of these two writers states the theory of race which he holds, not of course the Nordic one but the same theory with the names changed to suit ancient Athens. Socrates takes hold of the words, examines them, criticises them, destroys them and no more is heard of them: perhaps a few Athenian slaves for one reason or another maintain their belief, but

Socrates has shown all sane citizens that they are not scientific, and nobody cares what a few slaves may think.

But we live under the twinkling eye of the fat-bellied porcelain god: we do not have access to a Socrates who asks, "What has science to say about Nordic supremacy?"; we assume that its advocates are themselves scientists and on the way to becoming Socrates themselves perhaps. The emancipated slaves, so long as they have any excuse for believing themselves Nordic, rejoice and pass laws prohibiting anybody from teaching anything else but the doctrine of Nordic supremacy and the officials in charge of immigration act accordingly.

And as a false prophet always finds honour in his own country Mr. Madison Grant and Mr. Lothrop Stoddard get a substantial quid pro quo for any searchings of conscience they may feel for making fools of themselves. Perhaps the history of Mr. James Hunt, Honorary Fellow of the British Ethnological Society and President of the Anthropological Society, may throw some light upon this aspect of a very human problem.

In 1863 the learned Hunt read a paper entitled "The Negro's Place in Nature" in the course of which he arrived at the conclusion that "the negro is intellectually inferior to the European, and that the analogies are far more numerous between the ape and negro than between the ape and European; that the negro becomes more humanized, when in his natural subordination to the European than under any other circumstances; that the negro race can only be humanized and civilized by Europeans, and

that European civilization is not suited to the negro's requirements or character."

Now see what happened to Mr. Hunt when he died: the following is an extract from an obituary notice in an American Paper of 1870.

"We are pained to hear of the death of Dr. James Hunt, beyond doubt the best, or at all events the most useful, man in England, if not, indeed, in Europe. The man that leads all other men in knowledge essential to human well-being, that thus extends the bounds of human happiness, and best illustrates the wisdom and beneficence of the Almighty Creator to His creatures, is per se and of necessity, the best man of his generation; and such a man was the late Dr. James Hunt of England . . . Dr. Hunt, in his own clear knowledge and brave enthusiasm, was doing more for humanity, for the welfare of mankind, and for the glory of God, than all the philosophers, humanitarians, philanthropists, statesmen, and, we may say, bishops and clergy of England together." . . .

Now that is what is called in some quarters "some bouquet" to hand out to a dying or dead scientist and though it would be invidious to suggest that Dr. Hunt or Mr. Madison Grant or Mr. Lothrop Stoddard is or was on the lookout for such a bouquet it must be pleasant to be on the side of the big battalions of public opinion; and, if one's scientific critical faculty is not well developed, one is more likely to side with popular prejudices than against them.

Indeed, if we wish to roar as gently as any sucking

dove, we can say of these gentlemen that their heart is better than their head. For think what a service is done, not to humanity, but to one's neighbour, by giving him grounds for believing that without any effort required on his part he is superior to a whole mass of people.

Of course the best way of getting that result is by a first-class war; the drink-sodden Englishman discharged from prison whither he had gone for ill-treating a child could at least know that he was a better man than all Germans whatsoever; and, if his conscience should for a moment have had the slightest doubt on the matter, public opinion would have hurried to reassure him and to add that it would be unpatriotic and dishonourable to think otherwise.

But as wars are expensive and wasteful, people like Mr. Lothrop Stoddard are applauded for performing a similar service: each country has one or more of them, the Germans have Houston Chamberlain, the English, Kipling—not the dear Kipling of the Just So Stories but the other Kipling alas! as well known——

We must admit, however, that it is not all a bed of roses for these apologists for human prejudices, for human nature is wayward and often has a trick or two up its sleeve which will make the calculations go all wrong. Take for example the deplorable misfortune of Mr. Lothrop Stoddard over the late war. 1916 found him in Boston wringing his hands and despairing for the future of humanity; for were not the Nordics the noblest race of human beings and were not the Germans Nordics, and were not the Germans being wiped off the face of the

earth? Nobody had more right than Lothrop Stoddard to a face as long as the Nordic head is long: and he wrote and spoke about the awful consequences which he foresaw.

Then America entered the war and as Mr. Stoddard's science was based on nothing better than emotionalism it is not surprising to find it shift some of the premises which did not fit in with the new order: the war did far more astonishing things to greater men than he. In that pompous little unhistorical novel, "Racial Realities in Europe," we are told that the War was lost by the Germans, largely because they did not realize that, far from being any longer Nordic, they had gradually become Alpine.

"They did not stop to consider how times had changed; how other nations had developed, and how they themselves might differ from the Germans of former days. Here is where a genuine understanding of racial realities might have helped to clear their eyes for it was during the closing years of the nineteenth century that knowledge of racial matters became definite and the importance of biology—of science of race—began to be appreciated. Unhappily, this new science was, in Germany, quickly perverted into a weapon of jingo propaganda. A powerful group of national-imperialists, headed by popular writers like Houston Stewart Chamberlain seized upon biology and prostituted it to their own ends."

Apparently Mr. Stoddard objected merely to the Germans imagining that they really were "blond beasts"; and had they indeed been Nordics all would have been well with Houston Stewart Chamberlain. What difference

there is between the methods of the "powerful group of national-imperialists" and Mr. Stoddard's own, the reader will doubtless like to think out for himself. The whole incident shows how fortunate amid the changing fortunes of humanity is a scientist who does not build on objective truths.

Indeed that is one of the most noteworthy phenomena about these race fiends, their bland passion for contradicting themselves. Science aims at a body of hypotheses, enlightened guesses, which are not mutually destructive; pseudo-science aims at a body of hypotheses, which may be as mutually destructive as need be, provided there are enough of them to provide figleaves for all their prejudices. Thus the race fiends state that mongrels are always bad and that the offspring tend towards the worse stock; and yet we find them writing in an American magazine a "proof" that all children of Jew-Gentile marriages have the characteristics of gentiles. All race fiends in America shout about Nordic supremacy; yet one from Virginia speaking of a club in Minnesota where the members are Negroes with white wives, quotes the following with apparent approval: "the white women associated with this society do not constitute a social loss to the white population, for they are a worthless and degraded set of human beings, *mostly Swedes or Germans,* or otherwise foreign born"—in passing we may note that though the war convinced Mr. Lothrop Stoddard for the first time that Germans were not Nordics, Swedes, in spite of their unashamed neutrality, have hitherto been admitted to the elect.

There is a way of reconciling these statements, and one way only: they are all of them needed to give a scientific sanction to the contradictions of race prejudices, and in the accomplishment of this task they achieve their unity.

Sufficient examples of the shameful misuse of science and scientific terms in the interests of race prejudice have now been given: if the reader will compare these typical quotations with the naked truth about race as science understands the term, he will realize the extent to which his fellow citizens are being misled: but this is not all our task and we must look at a more positive side of the question.

A book called "White America" and published by the White America Society, Richmond, Va. has some beautiful examples of science manhandled in the cause of prejudice and among them the following paragraph:

"The known laws of biology would lead us to the conclusion that mongrelization results not so much in a blending of the race traits and capacities of the races which are parties to the crossing, as a domination of the traits and capacities of the lower or more generalized race. The heredity of the race more nearly representative of primitive man will prevail. The character of the mongrel is a mosaic, an aggregation of hereditary influences, conforming generally to the lower race, but disturbed by the urge inhering in the germplasm of the higher. This explains why the mongrel's ability is but little above the lower race and accounts for the instability of the mongrel."

Now it is quite simple to say that this paragraph is a marvellous example of pseudo-scientific claptrap and to

deny its validity altogether: in so doing you would be quite correct; but if you are arguing with a Virginian the next step in the argument will probably be: "Then would you not mind your daughter marrying a Negro?" and what are you to answer then?

You answer should be: "I admit that I should very much object to my daughter marrying a Negro: not because of any 'known laws of biology,' but for two reasons, one emotional and the other practical, neither in any way scientific.

"The emotional reason is my own personal prejudice in favour of people and things like myself and what I have been accustomed to know and use: the practical reason is that my daughter and all my children would be handicapped severely in the terrible struggle which each individual has got to wage between himself and society. I would be led by the second to advise the young couple not to live in the southern states and I might even be moved by the first to ask them to go and live in some place such as Dahomey or Senegambia where I need never see them again. But I would not claim that my attitude was scientific or based on known laws of biology."

Indeed if you made any such claim you would only be rationalizing your prejudice, using synthetic figleaves in fact; and in a personal matter such as that suggested by the Virginian, that is perhaps the best thing you could do, seeing that the only alternative, that of adopting a Christian point of view, is probably outside the capabilities of your character—moreover, to quote a state publication of Virginia, "let us turn a deaf ear to those who

would interpret Christian brotherhood to mean racial equality."

But if you were a statesman, who must solve all the problems which arise from having to guide and control citizens of several races, your doping yourself with the falsities of Madison Grant would be a crime and a disaster. For if you believe that racial differences of culture are an inherent factor in a man's race, you will be incapacitated from solving the problems which you must solve.

You find for example much crime, vagrancy, immorality among certain classes of immigrants; what hope is there for you if you adopt the fatalistic attitude that crime, vagrancy and immorality are inherent in the race of their perpetrators? You may stop more Jews and Southern Europeans from coming in, but what about the millions who are already arrived, who are indeed already you? For the time is surely not far off when America will turn and rend these false prophets of race supremacy for making more difficult her problem by sowing broadcast fresh seed of race prejudice.

The first thing that is needed is a realization that quack science is every whit as dangerous as quack medicine: for not only does quack science do no good with its attempts to heal, but it invites disaster by a false diagnosis which fails to reveal the true causes of social illness.

For science, real science, has something to say about race and racial differences; it does not repeat in longer words what our prejudiced hearts would like to believe, that we are the chosen people and the other fellows

branded in their germplasm with an inferiority which through no fault of their own makes them unfit for our companionship; but it does not deny that there are differences between man and man, people and people.

I. "A race type exists mainly in our own minds."

II. "There is no such thing as racial culture."

With those two texts from Professor Haddon let us sum up briefly the teachings of real science on the race problems such as those which trouble America to-day.

First, "a race type exists mainly in our own minds"; true a Negro has a dark skin and woolly hair, but many southern Europeans have darker skins than some negroes. Let us admit, however, the average difference in certain physical characters; what is important is that our picture of mental differences is purely subjective. Clearly most Negroes are socially lower than most whites; we say that it is because it is in their germplasm that they should be lower, but that is false. The true cycle of events is this, Negroes are unlike us in many ways, physically and in their way of doing things, their traditions in fact; people with different traditions from our own are felt to be inferior; we treat them as inferior and as a result they do become inferior. Life is a hurdle race wherein most of the hurdles are social prejudices; for Negroes we raise the hurdles a foot and yet are surprised that more of them trip up.

There is no doubt, to take another example, that many American Indian communities were, before the coming of the white races, noble, æsthetic and religious, often beyond our own standard: we give them drink, diseases and

an alien code of beliefs and morals, we take from them occupation, land, legend and tradition; then we look at the few which we have kept and domesticated for use as movie extras and complacently think of our own superiority.

"A race type exists mainly in our own minds": for instance an American was telling the author of the Jew menace which in his opinion threatens his country, and noticing that the author was not very enthusiastic, not shuddering at least, the American glanced at him sideways and said: "Of course there are Jews and Jews; now we think very highly indeed of *English* Jews." And the author did not trouble to set his doubt at rest and protest his beef and beer, Viking Anglicanism. He did not even say that he would have valued a conversation with Einstein more than one with his then present company, who indeed was of pronounced "Mediterranean" type.

"A race type exists mainly in our own minds"; in other words "give a dog a bad name" is a pregnant proverb. It is perfectly true that Polish Jews are some of them a great nuisance, but so are some Nordic Christians, and if your attitude towards the Pole is to be, "go and see what the Polish Jew is doing and tell him not to," he is likely to fill your prisons. As he is different from us and as that is enough to damn anyone, we shall probably not mix with him except on business; and if he happens to be musical or to know a great deal about mathematics or philosophy, it will be our loss, not his—besides we Nordics have outgrown music and mathematics and philosophy.

Second, "There is no such thing as racial culture." In other words Mr. Madison Grant is in a sense wrong to suppose that if a miserable, ill-educated, starving Italian knives his employer on the East Side, New York, it is because his father was born in Rome; and because therefore he is of a lower culture.

But there is a sense in which he is right. Our Italian is a lawbreaker because he is ill-adjusted to his environment; pitched into New York he has not been able to get on his legs because he was bred up in a totally different atmosphere. A New Yorker might experience just such another collapse if he found himself "up against it" in Rome. In short all the inferiorities or superiorities which some people attribute to race are really attributable to good and bad education, in the widest meaning of the word—that is, all the influence to which the individual has been subjected from birth upward.

If Mr. Lothrop Stoddard had been adopted by a Negro in equatorial Africa at the age of two he would not be able to read, to drive a car, to wear a tuxedo jacket, or to talk about "the new scientific realism"; and he would not necessarily have been a head chief, but more likely have occupied a place in society similar to that which he does occupy here to-day, a sort of third-class medicine man or rain maker called in by the ignorant in an emergency. Moreover the Negro baby for whom he might have been exchanged would with an American education be able to do all the things mentioned above.

It must be admitted, however, that it it hard to see how he could have taken Mr. Stoddard's exalted position

in the Klan, over and above these other attainments, but that, as we have said, would not have been for lack of ability so much as for possession of pigment.

In short it is environment, education, social milieu that counts, and not race, and America's problem is to mitigate the shock and dislocation when an alien finds himself uprooted and transplanted. That some of the seedlings are not the best that could be obtained, is true, but this is not because of racial inferiority; it is because the type of immigrant who has been most in demand in the past is often of doubtful quality. If America had set out to attract Dantes and Benedetto Croces she would have had no alien problem at all, but the fact is, she set out to attract cheap labour and as a result she has got Chicago.

"There is no such thing as racial culture"—yet hear once more Mr. Lothrop Stoddard. . . .

"And surely nothing reveals more strikingly the supreme importance of race than the story of America itself. If environment rather than heredity were the basic force in human affairs, here was a unique opportunity of proving it. Coming into novel surroundings, the Europeans who migrated to the New World should, according to the environmentalist theory, have rapidly developed into beings vastly different from their kinsmen in Europe. Especially should the differences which marked the newcomers while they were in their European homes have quickly disappeared, their changed enviroment fusing them into one or more genuine new types. Yet nothing of the kind has occurred."

Is Mr. Stoddard using the favourite device of the pseudo-scientist, setting up some idea easy to knock down

and alleging that his opponents really hold it; or is he merely dense?

The reason why Americans are rather like Europeans in their culture is the same as the reason why Chicago, Yale and Harvard Universities are like English universities so far as buildings are concerned;—because they have copied European models. Environment means more than geography, it includes the warm blanket of human ideas and traditions which keeps the individual imprisoned in the womb of society, just as he was once imprisoned in his mother's womb. This blanket is European in America also.

But even here Mr. Stoddard is unjust to his countrymen, for he overstates the case: though American culture is certainly like European culture in many ways, to an Englishman it is the contrasts rather than the similarities which seem most startling. Isolated by the Atlantic, with all the new stimuli of a new environment, America is already very different from the Old World: and in the future she will be still more different for her race problem is how to use all her dissimilar cultures to advantage, how to get the best out of the Italian, the Irishman, the Englishman, the Jew, the Negro, how to help each to readjust himself so as to forge a new weapon against time such as Europe has never wielded—and not to adopt a policy of despair and say, with tears of hysteria, "I'm a mass of inferior races, it is too late to do more than to exclude others from coming, I can't do anything with those I have got, because Mr. Madison Grant has proved that they are a curse and a danger."

One approach to the problem will be to study the true scientific facts about education and culture contact and part of that study will probably lead to a fuller appreciation that each culture has something to give, that a steam-roller flattening into one shape is absurd, that "unity in multiplicity" can be the motif for a Federation of the good in all her cultures, a federation of cultures wider than any the world has ever seen.

Race prejudice will always remain so far as science is concerned, but science can help those other forces of the human intellect, to which its elimination must be referred, by destroying all pseudo-scientific mouthings which may stand in the way of such a happy consummation. When the race fiends say that some races are rotten at the core they close the gates on hope, certainly so far as America is concerned. Fortunately, however, they are false prophets and the truth is not in them. They are but one more manifestation of the age-long forces of reaction from which Prometheus alone can save us: they are a warning of what our plight would have been if Prometheus, like them, had gone over to the enemy.

CHAPTER II

THE HEREDITY FIENDS

In the last chapter we dealt with race prejudice, race pseudo-science and some typical exponents; in this chapter we will deal with class prejudice.

Class prejudice has been tremendously assisted in its effort to seem respectable by synthetic figleaves woven out of false inferences from the little scientists know about the biological laws of heredity. Moreover the demand for an optimistic solution of man's future problems has sought in this same direction for a justification of an extreme trust in eugenics. Our subject matter now therefore is false doctrine about heredity.

In order to illustrate the misstatements and stupidities from which the reverent and humble public suffers in this direction we will analyse the works of a typical "heredity fiend," A. E. Wiggam, who believes that through an understanding of heredity we may here and now be led by science into an earthly paradise.

. . . . . .

Ever since I first came to America, I have been pursued by a rumor that in some unspecified state there was a university where students could graduate in cheerleading. Having failed to discover a local habitation and a name for this institution I had begun to assume that

the whole story was one of those which Americans tell to Englishmen in their youth in order that they may have something to laugh at in their old age. But since I came across the works of Albert Edward Wiggam I have been reconvinced of its actuality; for whatever subject may have been his "minor," his "major" was certainly cheer-leading.

Nearly every page of his entertaining books contains superlative admiration of someone or other; "the most brilliant workers in the world," "the most crucial work in existence," "the whole sweep of modern investigation"; such phrases magnify, like the sun at dawn, the shadows of research students and college associate professors.

In one place we find somebody studying "nine hundred and fifty-six of America's most distinguished men of science"; and we are set to wondering how many "most distinguished men of science" were left unstudied; and at any rate a European feels that the recorded number exceeds by far what the old world could boast in a thousand years.

In another page we are told of a gentleman named Woods, who wrote a pious book to prove that "moral character and intellectual ability tend strongly to go hand in hand"; this, Wiggam declares, is "one of the most brilliant generalizations of modern science." And as to Woods' proof that the character of kings and queens, marked by him according to virtue with ten as a possible full score, is the one basic cause of the rise and fall of nations; its "great significance to the philosophy of history is just beginning to be appreciated."

Again, the fact that out of forty apartment houses in Washington, D. C., only one forbids children on the premises is hailed as "a positive pæan of hope for better babies." And finally Wiggam is too generous to keep praise merely for whole human beings and joins with Woods, once more, in boosting the chromosomes themselves; "the most important beings *for their size* in the whole world";—and, when you come to think of it, the importance of a chromosome the size of the Woolworth Building would certainly beggar the ordinary imagination.

Here, too, is a passage in which the author gives us his own "reactions" to the chromosomes—"nothing in all nature is more thrilling than to watch those life processes under the microscope . . . the marvellous and to us still mysterious way in which they move . . . all carried on as though they were endowed with some inner intelligence or else were under the guidance of some Supreme Will, acting with a vast "purpose" in view—all this to my mind is the most inspiring and exciting series of events which it has ever been the privilege of the human mind to contemplate. Our poets write of stars, of ocean storms, of waterfalls, sunsets, waves, social inventions and government. But to my mind vastly more inspiring and wonderfull is the mysterious way in which those little particles of living material move their wonders to perform," etc., etc.

Now all this is as an excellent example of the application of business methods to science. Superlatives and sentimentality are two of the "s's" of salesmanship and sure enough Mr. Wiggam does not forget a third "s," namely, sex-appeal: his book is advertised as a unique book on

marriage. Page by page some treatise on business psychology has been followed, until all the ingredients have been mixed in a way bound to break down sales resistance and sell chromosomes to the public. Let us see therefore whether Mr. Wiggam's product does not contravene the pure mental food laws laid down by scientific morality.

From the selling point of view the campaign has been perfect. "The New Decalogue of Science" is a best seller and thousands flock to hear its author stroking the backs of his chromosomes; in fact Mr Wiggam has achieved his life object as it is described to us in these words: "deeply impressed with the importance of the subject, he resented the fact that biologists wrote and talked only for other biologists. And so he determined to dedicate his life to the work of making the vital truths of this science understandable to the man in the street." Now it is certainly worth while writing the vital truths of this science so that they may be understood by the man in the street; but in so doing it should not be necessary to write so that biologists are made to blush for themselves and their mistress, Science. Let us quote therefore a few sentences from Mr. Wiggam's books.

"Social classes, which you seek to abolish by law are ordained by nature: it is in the large statistical view of things, not the slums which make slum people, but slum people who make the slums."

"The whole sweep of modern investigation indicates that if five hundred, possibly one hundred, such men could be taken out of human history there would be no great or worthy history;

that without the prophets there would have been no Bible; without some unknown genius of the past, no printing; without Phidias and Angelo, no art; without Plato and Kant, no philosophy; without Aristotle and Bacon, no science."

"Do you know that about half of the great men and women of the world were either born from great parents or ancestry or else left great descendants? That contrary to popular notions, the children of great men are practically always remarkable, provided the father married a woman of great mental powers like his own or even a commonplace woman with great ancestry? Do you know that practically all of the remaining half of the great men and women of history have been born from parents and ancestors of sound character and ability? That numerous famous men have had a carpenter or shoemaker or man of similar occupation for a father, but that until recently, in this machine age, such men were usually skilled craftsmen of excellent, often extraordinary, capacity and character?"

"Do you know that it is nearly fifty times as advantageous to have a preacher for a father as it is to have an unskilled day-labourer?"

"Some have said that nations have risen and fallen because economic conditions changed, trade routes were moved, the church came into power, culture fell into decay and the like. But they have failed to inquire why conditions changed . . . yet this study makes it seem evident that always and everywhere it is the blood of leadership, the heredity, the inborn quality and character, strength or weakness of the ruler or rulers of every nation that has been the chief factor in making the ever-changing differences in politico-economic history."

"I cannot present the highly technical proof, but every biologist knows that intelligence is inherited, energy is inherited, insanity is inherited, emotional possibilities are inherited, a man's inner character is inherited."

These quotations are sufficient to show that as with our friends, whom we examined in the last chapter, their writer has the good fortune to be on the side of the big battalions of public opinion; so far as his political creed is concerned there is no difficulty whatever in placing him, for he tells us the sort of thing which every reactionary hopes is true. If he is able to give scientific proof of assertions such as those quoted, then it is clear that he has proved that the people who call themselves progressives and are called radicals by their opponents are altogether fantastic, wrongheaded and unscientific. If on the other hand his science is bad, is not science at all, but pseudo-science, then this is merely another example of synthetic figleaf manufacture, intended in this case not to hide race prejudice but its twin ugly sister, class prejudice.

What Mr. Wiggam pretends to do is to show that the opinions of reactionaries are logically derivative from the works of T. H. Morgan, Bateson, Mendel and de Vries; that the biological laws which govern human heredity prove conclusively that the rich are rich because they are intelligent, that low incomes are due to poor heredity, that slums are made by slum dwellers; for as our author says "on the general average people with a little

money or a great deal of money have more intelligence and character than people who are not able to save their money, create wealth and utilize their opportunities." In fact, intelligence to make money is inherited; therefore the distribution of money is natural and just in any given society; that is the argument in a nutshell.

Furthermore, since heredity, not environment, is the cause of success, the people at the top of the social scale are there through their good fortune in having come from good stock; the underpaid, underfed slum dweller, miner, textile worker, agricultural labourer, must not complain: he is as he finds himself, because he comes of bad stock.

Finally, anyone who wants to adjust conditions so as to redistribute wealth and opportunity, is not only dangerous to privilege and vested interests, but an imbecile who does not know his biology. It is due to heredity that the working classes do not produce any geniuses, they come of bad stock and are a curse to society.

Before we prod a little deeper into the seething mass of our author's biological fictions let us examine one of his sociological facts in order to see whether there may be another way of looking at it, at least on the surface. He produces various statistics to show that what he calls genius is far rarer among working-class children than among the professional classes; and he constantly states that heredity plays the preponderating part in this difference. Further he refers to experiments in which it is shown that groups of less efficient children, as measured by an intelligence test, profit by education less than groups of children who started more efficient: education gives

more to him that hath, he says, and infers that working-class children, given all the education in the world, would remain inferior to children of a higher social status. This, if it were true, would amount to a scientific refutation not only of the theory of socialism, but of the mildest liberal democracy.

Now it is exceedingly easy to show that this is a very onesided point of view: take for example a comment in the ultra-conservative London Morning Post on the work of the English Workers' Educational Association. "The standard of work," we are told, "achieved in the first classes started was remarkably high. An experienced history examiner in Oxford, who went through a large number of essays, selected at haphazard, made the deliberate pronouncement that over one third of them reached the first class standard of the Oxford Modern History School." Moreover it will hardly bring upon the writer a charge of extreme radicalism if he quotes—not Karl Marx—but Marshall's "Principles of Economics," where the author states that more than half his country's best natural genius lies among the working people, and that the greater part of it was never developed through lack of opportunity: this indisputable fact, says Marshall, is the best measure of the waste of genius.

Indeed, the general position which Mr. Wiggam takes up that "an ounce of heredity is worth pounds of education" is so untenable that he is constantly forced to be inconsistent. Every now and then he adds a sentence or two about the necessity of good enviroment or education, which nullify the rest and invalidate all his social

implications. He leaves the whole problem in precisely the same condition as it has always been; he says in one place, for instance, "there is therefore not the slightest ground for quarrel between those who believe in heredity and those who believe in environment. It is only the fool who does not believe with all his heart in both." Precisely! but Mr. Wiggam should not then write books to prove that the laws of heredity show that environment is much less important than heredity, that people with good heredity are rightly the rulers, the rich and the easeful, that democracy is futile because of the chromosomes.

In short, Mr. Wiggam is a bland conjuror who tells us that he has an egg hidden in his handkerchief, then by shrewd use of psychology hypnotises us into seeing the egg, and finally takes pains to assure us that it wasn't an egg at all. A waste of time, some will say, but human nature being what it is, most lay readers will in their innocence believe that they saw the egg—that is, that Mr. Wiggam has proved the absolute omnipotence of heredity in social life, while he has the additional safeguard of being able to point out that he expressly denies in his book precisely what he has led every unsuspecting ignoramus to believe.

That this is mere synthetic figleaf manufacture is further suggested by the bland way in which Mr. Wiggam announces that "the natural bias of the man in the street, the warm-hearted philanthropist, the reformer, socialist, bolshevist and extreme environmentalist of every type is toward believing that the effects of education are transmitted, since it is his most ardent hope and deepest life

conviction that man can be reformed and made permanently wiser, healthier and better by education or by some radical change in the social machinery. . . . Three-fourths of all radical programs and reforms, however, continue to proceed upon the assumption that if only this generation can be placed amid happy economic and educational conditions, the next generation will be born wise, just and generous."

Here we have clear proof that Mr. Wiggam is a political pamphleteer and not a scientific writer. He pretends to apply the known laws of biology and heredity to social life, but his real object is to discomfort reformers and all the other people respectably believed to be bolshevists. How does he do this? He states one of the very few firm generalizations about inheritance, the negative one that, as far as we know, acquired characteristics are not inherited. The "give a dog a bad name" tactics work admirably. The people who used to disapprove of radicals because they found their theories uncomfortable and perhaps financially deleterious, have now a reason, more respectable and less closely based on self-interest; they can say, thanks to Wiggam, "radicals are bad people because they do not understand the laws of heredity."

It is often thought by simple folk that when a workingman finds that he has not enough money to buy shoes for his children, and in consequence grumbles and votes for a strike, he is in the pay of Moscow; whereas it ought to be clear that human irritation is the cause rather than bolshevik gold. It is part of the conspiracy mania which is the post-war descendant of spy-mania. Mr. Wiggam is

akin to the conspiracy maniacs, if he really supposes that an erroneous belief in acquired characteristics is the basis of what he calls bolshevism.

A simpler and saner man would see that most people believe that if this generation builds up better houses, better schools, better libraries, better laws, better ideals, then the next generation will be better off than this one, simply because homes, schools, libraries, laws and ideals—that is, the atmosphere or environment of children and adults alike—so powerfully affect us for good or ill. If Mr. Wiggam had been exchanged at birth for an Italian peasant child and had never left his mountain valley home he would not have been able to write books such as "The Fruit of the Family Tree."

The fact that acquired characteristics cannot be transmitted to a man's offspring seems to give a peculiar delight to many reactionaries and a delightful use of it is made for the cause of race prejudice by the Bureau of Vital Statistics, State Board of Health, Richmond, Va., which publishes the statement that "the mental and moral characteristics of a black man cannot even under the best environments and educational advantages become the same as those of a White man. *But even if the Negro's attainments should be considerable, these could not be transmitted to his offspring since personally acquired qualities are not inheritable.*" As we have seen, this body says, piously, "let us turn deaf ears to those who would interpret Christian brotherhood to mean racial equality": but they must realize that though God, according to them, is a respecter of persons, nevertheless the laws of heredity

are no respecters of persons and what is true of black is also true of white.

To return to Wiggam: this rather long analysis of motive is necessary because the motive in question is typical of The New Age of Faith; scores of writers and thousands of readers believe in Wiggam and sincerely trust his "scientific" exposure of social theories which they do not like; he helps them to feel respectable in their prejudices and thereby causes the enemies of truth to blaspheme.

Let us now turn to another side of his school's work; the heredity fiends not only bolster up old error but purvey false hopes.

"Genius of a high order is due to the fortunate concentration in one germ-cell of a large number of the great human qualities."

"Insanity or feeble mindedness or mediocrity or genius or musical or mathematical ability or capacity for self-control—many and possibly all, of these characters are due to genes, or factors or determiners in the germ cells from which the persons possessing these qualities are born."

"If dull people can be persuaded to practise birth control and the absolutely defective be positively prevented from marrying at all, then the race will automatically improve and remain improved."

"Since we are now discovering the laws which govern the inheritance of susceptibility and immunity (to disease), it presents a very happy outlook for the future. It means that by wise marriages, we can, so to speak, 'steer around' these diseases and produce families that are wholly immune from them."

"The crowning optimism of modern biology, comes, I think, from Woods' book, in 1903, the first ever brought forward upon this important question, that moral character and intellectual ability tend strongly to go hand in hand."

"Have you any laws in your state for finding potential criminals, prostitutes and paupers while they are yet children, which science can now often do, and thus prevent their future ravages upon society, as well as their own misery?"

"We already have enough science right at hand to bring the world into an earthly paradise! It remains only for all men to apply it."

The reader will be well advised at this point to turn to the last part of this book and read exactly what the science of biology has as yet discovered about human heredity and then, suspending judgment as to whether this is or is not sufficient to justify these assertions and the last in particular, we will first consider how men could apply it in order to bring the world into an earthly paradise.

Mr. Wiggam believes that moral excellence, intellect, beauty and success go hand in hand, and that eugenics is the science which ensures that they shall exist in the children of the next generation. Does he tell us how this is to be done? What are the methods of eugenics? We saw in an earlier chapter what Sparta did; are we to do the same? No, Mr. Wiggam knows his audience too well to suggest such a thing; indeed he is careful to say that eugenics is

not enforced marriage,
not killing off the weaklings,
not a scheme for breeding supermen,
not a plan for scientific love-making,
not a scheme for breeding human beings.

Then, we may ask, what in heaven's name is it? Hear the answer: eugenics is

a new vision of a race of better men,
simply the projection of the Golden Rule down the stream of protoplasm,
simply conscious, intelligent organic evolution,
a method ordained by God, and seated in natural law for securing better parents for our children.

So now we know!

But has our author nothing to offer but such futile verbiage? Yes, he descends to earth from the realms of uplift and is coherent long enough to say that eugenics is "the study and guidance of all those agencies that are within social control, which will improve or impair the inborn qualities of future generations."

In short he wants to control inherited qualities; he believes that crime, insanity and stupidity are inherited and therefore he must believe in some sort of machinery for preventing marriages, which he thinks will bring them about.

This means enforced celibacy, enforced childlessness or enforced sterilization; it means restriction of choice in marriage for all; and it means someone who is fit to judge on such serious matters as this, a Grand Inquisitor legislating for human marriages. Mr. Wiggam cannot be so

ingenuous as to deny this, nor so insincere; though fear of offending susceptibilities makes him call such a system "the projection of the Golden Rule down the stream of protoplasm," a name nebulous enough to please everyone except the unimportant minority who may like names to have some sort of meaning.

We have then a kind of inquisition which is to judge fitness of people to marry; it is to prevent Kallikaks and encourage Edwardses. It "has already enough science right at hand to bring the world to an earthly paradise," and to tell at once whose children will be great and whose will be worthless.

Thus we are told of several fine examples of the right sort of mating and notably of the mating of Richard Edwards with Elizabeth Tuthill; "she was," he says, "a marvelous girl, nearly three hundred years ago at Hartford, Connecticut. She married Richard Edwards, a great lawyer. They had one son and four daughters. They have all left their mark upon American blood. . . . Later in life Richard Edwards married Mary Talcott. She was an ordinary, everyday, commonplace woman. She had ordinary, everyday, commonplace children. The splendid heredity of Richard Edwards was swamped by the mating. . . . From Jonathan Edwards (the grandson of Elizabeth Tuthill) . . . have descended 12 college presidents, 265 college graduates, 65 college professors, 60 physicians, 100 clergymen, 75 army officers, 60 prominent authors, 100 lawyers, 30 judges, 80 public officials, 3 congressmen, 2 United States senators, and 1 vice-president of the United States."

Here is his prize example of the virtues of good heredity and provided that all the lawyers, for example, were good lawyers, and all the clergymen practisers of Christianity as well as preachers thereof, it is certainly an excellent record. It would seem to show that heredity counts and that Elizabeth Tuthill's germ plasm is at least as valuable as good drainage, good schooling and infant welfare drives. Though Mr. Wiggam cannot produce many families like that, we must admit that such families are the exception and that quite a number of remarkable people have a bad lot of relations; nevertheless, after all is said and done, he is entitled to satisfaction over the Edwards family. If he can help us towards more such we shall not be sorry.

It is however to be regretted that Mr. Wiggam entirely forgets to mention all the facts about Elizabeth. He goes out of his way to tell us that her germ plasm was the decisive factor in this fine record, that when her husband married again, his heredity was "swamped by the mating," and we have other testimony that she was a "woman of great beauty, of tall and commanding appearance, striking carriage, of strong will, extreme intellectual vigour and mental grasp akin to rapacity." Now why does our heredity fiend not tell us that she was divorced "on the grounds of adultery and other immoralities" and that "the evil trait was in the blood, for one of her sisters murdered her own son and a brother murdered his own sister," that she was in fact afflicted "with an extraordinary deficiency in moral sense."

The situation becomes even more amusing when we

add that Mr. Wiggam's prize piece of evidence is used by a careful and reputable scientist, H. E. Walters in his book "Genetics," as an example of the great difficulty of eugenic control: "as shown by subsequent events," he remarks, "it would have been a great eugenic mistake to have deprived the world of Elizabeth Tuthill's germ-plasm, although it would have been easy to find judges to condemn her."

I cannot resist the occasion for composing an Imaginary Conversation based upon the pleasant fiction that Mr. Wiggam's desires as expressed in his books had been satisfied some hundreds of years ago; that the Eugenic Inquisition had actually been inaugurated, with Albert Edward Wiggam as Grand Inquisitor. The scene is the hall of the supreme court of the Inquisition; there enters an applicant for a marriage license, who has been refused her plea by all the lower courts.

Grand Inquisitor: Your name, madam?

Applicant: Elizabeth Tuthill, your worship.

G. I.: I see that you have a very bad record in your family. Is it true that your brother murdered his sister?

Elizabeth: I cannot deny it.

G. I.: And that your sister murdered her own son?

Elizabeth: It is true.

G. I.: A case of manifest hereditary taint and probably dominant in a Mendelian sense; were you to

marry, your descendants would cost the government many dollars in insane asylums and prisons. They would show lack of self-control due to genes or factors or determiners in the germ cells from which they would be born. Since we have discovered the laws which govern the inheritance of lack of self-control we can, so to speak, "steer around" this defect and produce families wholly immune from it. This marriage cannot be allowed.

Elizabeth: (Dissolves into feminine tears.)

The Devil: (who has been listening from behind a beam in the roof, slaps his thigh silently and mutters aside): Thank heaven for eugenics. That saves me from the awful spectacle of a family with 12 college presidents, 265 college graduates, 100 clergymen, 100 lawyers, to say nothing of a vice-president of the United States.

G. I.: I am sorry for you, my dear, but you should realise that eugenics presents a very happy outlook for the future.

Elizabeth: (mustering her feminine wiles)

Don't think I am crying for myself. I am crying for your disgrace.

G. I.: (surprised). What do you mean?

Elizabeth: (archly). Don't you think I'm beautiful?

G. I.: (guardedly). I don't complain of your charm, it is your sterling qualities of which I am doubtful.

Elizabeth: But just think on page 278 of your "Fruit of the Family Tree" you say that "the intelligent, active and energetic are more beautiful than the lazy, ignorant and stupid"; that "people with brains are usually better morally than people with empty heads" and "therefore it follows that good-looking people are better morally, on the average, than ugly people." Everybody knows I'm beautiful, nobody need know of my little family failings, unless you publish the account of this hearing: why not save your face and prohibit all reference to that and let me have my certificate? You have resolved to devote your life to the cause of eugenics, it is your duty to

suppress anything which would injure that cause.

G. I.: (rather red in the face). Well I am human, apart altogether from the fact that I am masculine; probably your brother and sister were more sinned against than sinning, brought up in a bad environment no doubt,—er, the exception which proves the rule of course. (Aside) Besides she's as likely as not to have bastards, if I don't look out. (Nods his head with infinite wisdom.) The certificate is granted. Members of the press will see to it that in the public interest nothing appears in the newspapers. Next case.

The Devil: (much discomforted) Beaten again by a woman! Why can't they be faithful to science; 265 college graduates, 100 clergymen! O hell! (flies there, as to a refuge).

Elizabeth showed her "mental grasp akin to rapacity" when she told the Grand Inquisitor that it was his duty to suppress anything which would injure the cause; for all pseudo-scientists are apt to see the necessity of fulfilling this duty. Not only does our author repress and suppress evidence that would go against him on the social side, but

he is none too careful with his biology; take for example this wretched business of the inheritance of acquired characteristics; probably it is best for purposes of making things simple for laymen and the man in the street to say that evidence for such inheritance is inconclusive. It is neither necessary nor honest to say, as our author does, "the most crucial work in existence on the acquired character problem is that of Professor Guyer of the University of Wisconsin . . . but none of these workers' claims to have induced an acquired character, notwithstanding the wide claims of the sort made for their experiments by the public press and writers who are not even able to read technical and statistical biological literature."

Mr. Wiggam knows that with most readers such a statement is safe, for very few of them are likely to have read "Immune Sera and Certain Biological Problems" by M. F. Guyer in the American Naturalist, Vol. LV, where just such a claim is made.

From what has been said on method and motive it will be seen that some of the heredity fiends misuse the trust laid upon them in this New Age of Faith: it remains now to deal shortly with a few scientific and common sense points which will show how frail is the hope they offer of leading the world through pain to perfection.

First, whether you call it "the projection of the Golden Rule down the stream of protoplasm," or merely marriage control by certificates, sterilization and segregation, some tribune will be required to arbitrate on cases. For example, in order to prevent imbeciles and certain classes of degenerate criminals from having offspring, sterilization

laws might be passed. Would any honest doctor or scientist consent to take the responsibility of carrying them out, when men like Madison Grant are just round the corner clamouring that the less valuable race stocks must also be sterilized? When the wealthy millionaire's son afflicted with congenital syphilis comes up for trial are we to trust our board to do its duty? If a marriage health certificate is required will many doctors be so egoistic and so brave as to believe that they can be certain that X or Y should or should not marry A or B? Knowing as we do that scientific experts are as prejudiced as any one else in political matters, that they are as likely as others to see the solution of a coal strike in the shooting of the miners or the hanging of the owners, may we not fear that way down in Tennessee a bright young man would find that membership in the I. W. W. was a stigma proving moronship and that every Wobbly should be sterilized? And under a communist government elsewhere will not someone else run a similar risk for an opposite reason?

Men are not Gods and despotism however enlightened has always proved too big a burden for man's moral nature.

Second, what standard of values are we to set up as our own? In the words of Browning:

> Now who's to arbitrate?
> Ten men love what I hate,
> Shun what I follow,
> Fly what I pursue;
> Ten who in ears and eyes
> Match me: we all surmise,

They this thing, and I that.
Whom shall my soul pursue?

Mr. Wiggam is very scornful indeed of people who ask this question and quotes someone who answers that we want men like Professor William James. He himself broadens the type and says that we want healthier and brighter people; but after all is said and done, everybody, except Mr. Wiggam and the soviet authorities, feels that it takes all sorts to make a world and that the mere conscious aim at a type would result in standardizing the best of life out of existence.

Third, even if we had honest judges and a standard of judgment *science does not guarantee results;* for what Mr. Wiggam seeks to prove by Elizabeth Tuthill is disproved by that lady when no facts are concealed. Byron, Keats, Darwin, Julius Cæsar, St. Paul, Dostoievski, were all invalids and the last three epileptics; while Calvin, Newton, Heine, Voltaire, Herbert Spencer, Robert Louis Stevenson would all have been exposed at birth by Sparta and by Mr. Wiggam too, only he would have called it by a prettier name. In other words history is packed with examples where eugenic interference would have impoverished the world beyond repair and we might almost regard the money spent in maintaining the unfit as a sort of insurance premium against the dangerous losses of the other policy.

Fourth, if we admit for a moment Mr. Wiggam's claim that immunity from disease, genius, musical ability, mathematical ability, self-control on the one hand, and

insanity, susceptibility to disease, lack of self-control on the other, are inherited, we would not be able to make much use of the fact. For consider, each of these is a unit character and as such transmitted independently from all other characters; suppose we want to breed for mathematical ability, we are sure to find with it in any individual's heredity some of the bad qualities too; are we to throw away the good because we are afraid of the bad? If we are to say "let them all come for better or for worse" then we are in no way altering our present habits of haphazard breeding.

We quote elsewhere in another context the following paragraph from Ripley's "Races of Europe": "Experience proves that the vast majority of the population of this continent shows evidence of crossing, so that in general we cannot expect that more than one-third of the people will be marked by the simplest combination of traits. We need not be surprised therefore that if we next seek to add a third characteristic, say the shape of the head, to a normal combination of hair and eyes, we find the proportion of pure types combining all three traits in a fixed measure to be very small indeed. Imagine a fourth trait, stature, or a fifth, nose, to be added, and our proportion of pure types becomes almost infinitesimal. We are thus reduced to the extremity in which my friend Dr. Ammon, of Baden, found himself, when I wrote asking for photographs of a pure Alpine type from the Black Forest. He has measured thousands of heads and yet he answered that he really had not been able to find a perfect specimen in all details. All his round-headed men were either blond

or tall or narrow-nosed, or something else they ought not to be." This amusing statement is of course equally true here; in fact the girl of the future will say: "I ought to marry you because you have mathematical ability and I ought not to marry you because you are not immune from tuberculosis; but I *shall* marry you because I love you and rather like the way you laugh."

Fifth, it is, however, ridiculous to talk about such complicated things as musical ability, self-control, tuberculosis immunity, mathematical ability as if they were simple Mendelian characters: they are not, and therefore cannot have Mendelian laws applied to them. Now all we know about the inheritance of characters is that in certain simple cases such as tallness and shortness of peas and colour of mice we can tell how many of the offspring will on an average have a given character; we cannot even then say which individual offspring will have the character.

It is like tossing up a coin; we know that for an infinite number of tosses the likelihood of either side being uppermost is equal, but we know nothing about any one throw; so with Mendelian characters we know that for an infinite number of offspring the proportions of children who will be mathematical and who will not be, for example, is fixed; but as human families are usually three or four in number, that helps us not at all.

But beyond this Science offers no proof and no evidence to show that these complicated characters of which Wiggam speaks are really inherited according to Mendelian laws; even if indeed they are inherited at all. We are therefore absolutely in the dark about them.

The reader will find in Part Three a list of human characters more or less proved to be Mendelian; if he considers their collective work towards building up a new and better civilization he will be able to judge the value of this claim of the heredity fiends.

Sixth, there is a very great difference between the characters wanted in plants and animals and those wanted in human beings. You can see whether a plant is tall or short, but you have to look for musical ability and this *looking for* is what we call education.

Because you can show that certain qualities sometimes run in families you cannot say that those families have the monopoly of those qualities. The Bach family, for instance, did not merely inherit musical ability from one generation to another; each generation found itself in an environment which looked for this ability and found it.

Now for every musician known and developed, there are a thousand potentially musical people whose education does not happen to have brought their gift to the surface. It follows therefore that you can discover no laws which will make it more likely that any given couple will have more musical children than a second couple; for the second couple may be just as potentially musical.

So if you want more musicians you are more likely to get them by testing and training ten times as many children than by waiting about in the hope of persuading people to marry one another for art's sake.

Seventh, assuming that "energy is inherited," as Mr. Wiggam claims; it is quite clear that it is not the energy which we inherit at birth that really matters to us or to

society, but far more the percentage of it which we are able to use; which in the long run our environment permits us to use. Now modern psychology has shown clearly that the difference between the person who can meet all the shocks of fortune, the changing needs of every day with dynamic energy, and the person who is lethargic and passive, is to be found in most cases in the state of mind, the absence or presence of internal conflicts of the individual. In many of us our minds are kingdoms divided against themselves and the energy that should be bestowed upon outside things is being dissipated by our effort to fight our own repressions and conflicts within. Moreover these conflicts are mainly caused by facts in our childhood environment, which have more influence on our energy than heredity.

In short, though nobody can be altogether satisfied with the present scientific status of psychology, we can safely say that what we know about our minds tends to emphasize the importance of environment and to minimize that of heredity. Mr. Wiggam takes no notice of this aspect but blandly states that energy, insanity, self-control are inherited.

Eighth, Mr. Wiggam points out that ants in amber two million years old are the same as living ants; "the living ant comes to-day from out those primal chromosomes almost without a change"; the same is true of man, yet Mr. Wiggam cannot see that the very immutability of the chromosomes which he so rightly emphasizes is disastrous for his argument.

After all, though his chromosomes, like those of the ant,

are unchanged during the last ten thousand years, man is distinctly different from his ancestors of those times; and he is different, not because of heredity, but because he is the animal which changes his environment. It is not the similarity but the difference between the man of to-day and ten thousand years ago on which the emphasis must rest—that is, on his environment and not on his heredity.

By tradition and education, not by biological heredity, we have built up something, while the ant has remained where it was. Hence the greater importance of guarding and improving enviroment, a practical task; while legislating for the chromosomes, apart from preventing some lunatics from having children, is impossible and even, perhaps, undesirable.

Ninth, compare the infant Aristotle, the mature Aristotle and the college graduate of to-day: the difference in social value between the first and the second is the difference between latent value and active value, and as Mr. Wiggam himself says more than once, the difference between latency and activity has nothing at all to do with heredity, but is a matter only of education. Aristotle was a product of his father and mother and he was the product of Athens. He got his latent qualities from the former, but Athens stimulated them into activity; and this notwithstanding the glorious piece of prose poetry by Sir Thomas Browne: "Give thanks to heaven, not that thou wert born in Athens, but that thou wert born from noble parents, and that honor, virtue and integrity lay in the same egg and came into the world with thee." If Athens

had been different Aristotle would have been different and that difference would have been in just those qualities which have made him of value to all time.

Now consider the college graduate who can read Aristotle, understand Aristotle and even criticise Aristotle; his chromosomes are the same, but he has evidently improved, not in potentialities,—for set him on a desert island from childhood and he would not become Aristotle,—but in active value; simply because he is in an environment which is heir to twenty-five centuries of learning and striving since Aristotle lived, and can do that much more with his individual brains. This is the inheritance which counts, the accumulated inheritance, not through the germ plasm but through the body plasm, the eyes, the ears, the brain; which alone has raised us above savagery; left us savages under our clothes, it is true, but savages with a literature, a tradition, and an accumulation of facts wrested from the night of ignorance.

And so eugenics in the small sphere which remains to it when the bombast of its over-enthusiastic publicity agents has been accounted for, can in the long run do nothing more than contribute its quota to the guarding and improving of man's enviroment of culture and learning; his true inheritance from his ancestors, without which he would be outwardly what he is inwardly—a savage.

And tenth, all this loose talk and false promising makes even more difficult the establishment of true scientific control in the small way for which we can hope. Eugenics of a sort is a possibility and a necessity for man's future but it is not to be helped forward by the sort of pseudo-

science we have been investigating. As Galton said long ago, eugenics "must be introduced into the national conscience like a new religion": we have seen an attempt to introduce it as a best seller.

To sum up, we can see from this typical example of a prolific literature that however patiently scientists are continuing their researches into plant and animal genetics, the popular adapters of this science have as yet little to offer us by way of positive hope for the future; with some of them, a humanistic end is served, but one which will not appeal to all men, the humanistic end of bolstering up that particular form of social prejudice vulgarly known as snobbery.

CHAPTER III

FUNDAMENTALISM, BRYANISM, ANTI-SCIENCE

Among all the primitive peoples of the world, there is not one which does not possess sacred legends and explanations of the beginning of all things: nor is it at all surprising that this should be so, for wonder and imagination, permanent qualities of the human mind, could scarcely find a more stimulating question than what happened "in the beginning."

A typical and very beautiful example of these creation myths is that of the Zuni Indians as it is reported in a volume published by the Smithsonian Institute: and not merely for its beauty, a sufficient reason, but for its value in elucidating a situation of present interest to Americans, part of it may be quoted here.

Before the beginning of the new-making, the Zuni Indians believe, Awonawilona (the Maker and Container of All, the All-father Father), solely had being.

There was nothing else whatsoever throughout the great space of the ages save everywhere black darkness in it, and everywhere void desolation.

In the beginning of the new-made, Awonawilona conceived within himself, and thought outward in space,

whereby mists of incense, steams potent of growth, were evolved and uplifted.

Thus by means of his knowledge, the All-container made himself in person and form of the Sun, whom we hold to be our father and who thus came to exist and appear.

With his appearance came the brightening of the spaces with light, and with the brightening of the spaces the great mist clouds were thickened together and fell; thereby was evolved water in water; yea and the world-holding sea.

With his substance of flesh outdrawn from the surface of his person, the Sun-father formed the seed-stuff of twain worlds, impregnating therewith the great waters.

And, lo! in the heat of his light, these waters of the sea grew green and scums rose upon them, waxing wide and weighty, until, behold! they became the Four-fold Containing Mother-earth and the All-covering Father-sky.

From the lying together of these twain upon the great world-waters, so vitalizing terrestrial life was conceived; whence began all beings of earth, men and creatures, in the Four-fold womb of the World.

Thereupon the Earth-mother repulsed the Sky-father, growing big and sinking deep into the embrace of the waters below, thus separating from the Sky-father in the embrace of the waters above.

As a woman forbodes evil for her first-born ere born, even so did the Earth-mother forbode, long withholding from birth her myriad progeny and meantime seeking council of the Sky-father.

"How," said they one to another, "shall our children,

when brought forth, know one place from another, even by the white light of the Sun-father?"

Now like all the surpassing beings the Earth-mother and the Sky-father were changeable, even as smoke in the wind, transmutable at thought, manifesting themselves in any form at will, like as dancers may by mask-making.

Thus as man and woman spake they one to the other. "Behold," said the Earth-mother, as a great terraced bowl appeared at hand, and within it water, "this is as upon me the homes of my tiny children shall be.

"On the rim of each world country they wander in, terraced mountains shall stand, making in one region many, whereby country shall be known from country, and within each, place from place.

"Behold! again," said she as she spat on the water and rapidly smote and stirred it with her fingers.

Foam formed, gathering about the terraced rim, mounting higher and higher.

"Yea," said she, "and from my bosom shall they draw nourishment, for in such as this shall they find substance of life, whence we were first sustained, for see!"

Then with her warm breath she blew across the terraces; white flecks of the foam broke away, and floating over and above the water were shattered by the cold breath of the Sky-father attending, and forthwith shed downward abundantly fine mist and spray.

"Even so shall white clouds float up from the great waters at the borders of the world: and, clustering about the mountain terraces of the horizons, be borne aloft and abroad by the breath of the surpassing soul beings: and

shall be hardened and be broken by the cold, shedding downward, in vain spray, the water of life, even into the hollow places of my lap.

"For therein chiefly shall nestle our children, mankind and creature-kind, for warmth in thy coldness."

Lo! even the trees on high mountains near the clouds and the Sky-father crouch low towards the Earth-mother for warmth and protection! Warm is the Earth-mother, cold the Sky-father, even as woman is the warm, man the cold being.

"Even so," said the Sky-father. "Yet not alone shalt thou helpful be unto our children, for behold!" and he spread his hand abroad with the palm downward and into all the wrinkles and crevices thereof he set the semblance of shining yellow corn grains.

In the dark of the early world-dawn, they gleamed like sparks of fire, and moved as his hand was moved over the bowl, shining up from and also moving in the depths of the water therein.

"See," said he, pointing to the seven grains clasped by his thumb and four fingers: "by such shall our children be guided; for behold, when the Sun-father is not nigh, and the terraces are as the dark itself, then shall our children be guided by lights.

"Yea, and even as these grains gleam up from the water, so shall seed grains like to them, yet numberless, spring up from thy bosom when touched by my waters, to nourish our children."

Anon, in the nethermost of the four cave wombs of the world, the seed of men and the creatures took form and

increased; even as within eggs in warm places, worms speedily appear, which growing, presently burst their shells and become as may happen birds, tadpoles or serpents, so did men and all creatures grow manifoldly and multiply in many kinds.

Everywhere were unfinished creatures, crawling like reptiles over one another in filth and black darkness, crowding thickly together, in so much as loud became their murmurings and lamentations, until many among them sought to escape, growing wiser and more man-like. . . .

Man and the creatures were more alike then than now; black were our fathers, the late born of creation, like the caves from which they came forth; cold and scaly their skins, like those of mud-creatures; goggled their eyes like those of an owl; membranous their ears like those of cave bats; webbed their feet like those of walkers in wet and soft places; and according as they were older or younger, they had tails, longer or shorter.

They crouched when they walked, often indeed, crawling along the ground like toads, lizards and newts; like infants who still fear to walk straight, they crouched, as before time they had in their cave-worlds; that they might not stumble and fall, or come to hurt in the uncertain light thereof. . . .

With this beautiful and poetic conception, bright with the morning dew of the primitive mind, fresh in our memory; let us turn in contrast to the following sentences from Darwin's "Origin of Species":

"No one ought to feel surprised at much remaining as yet unexplained in regard to the origin of species and varieties, if he makes due allowance for our profound ignorance in regard to the mutual relations of many beings which live around us. . . . Although much remains obscure and will long remain obscure, I can entertain no doubt, after the most deliberate study and dispassionate judgment of which I am capable, that the view which most naturalists until recently entertained, and which I formerly entertained, namely, that each species has been independently created—is erroneous. I am fully convinced that species are not immutable; but that those belonging to what are called the same genera are lineal descendants of some other and generally extinct species, in the same manner as the acknowledged varieties of any one species are the descendants of that species. . . .

"It is interesting to contemplate a tangled bank, clothed with plants of many kinds, with birds singing in the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; Inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the condition of life; and from use and disuse: a Ratio of increase so high as to lead to a struggle for Life, and as a consequence to Natural Selection, entailing Di-

vergence of Character and the Extinction of less-improved forms. Thus from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is a grandeur in this view of life, with its several powers, having been originally created by the Creator into a few forms or into one; and that while this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful, have been, and are being evolved."

Let us imagine Darwin confronted by a Zuni wise man with the Zuni account of creation. What would he say about it? He would say that it was poetry, the child of imagination; that, as so often with poetry, in spite of all æsthetics may say, it had moral lessons bound up in it; but that it had nothing at all to do with science or scientific method. Science might in the end find out by its own devious methods that the Zuni account was in many ways correct, though there were certain things, such as any knowledge of the first beginning or of the Creator that science could not even discuss, because science dealt only with the things created when they were once created and therefore in existence.

Darwin might even have gone further and told the Zuni wise man that he was not a scientist all the twenty-four hours in a day; that he had a faith, a part of his mind which accepted truths of another sort from those he had discovered or guessed at through science; but that even here he preferred the faith of his fathers, and the slightly

different idea of god which his fathers had bidden him accept. Finally he would have said that just as there were things about which no amount of science could ever hope to enlighten us, things like that which philosophers call "the first cause," and the Zuni "Awonawilona"; so there were things about which no man could accept the dictation of traditions. If a creation myth said two and two made five, nobody could allow such a belief as a good defence against a charge of fraud in money matters: and if a creation myth said that the sun was cold we must not teach it in view of what physics and astronomy tell to the contrary, for that is violating truth.

The Zuni wise man's attitude would be quite different; he would tell Darwin that his truth was never certain; that scientists had often been proved wrong and that moreover truth was not as important as goodness; that goodness rested in belief in what the tribe had always believed; that it was weakened directly these beliefs were questioned in the smallest detail; and that therefore Darwin's account of creation was the gateway to wickedness.

Making due allowance for their two different environments the Zuni wise man and William Jennings Bryan are in exactly the same position. Accident of birth made Bryan a believer in the Hebrew tradition of creation rather than in the Zuni, but that does not affect the general position.

A careful reading of a number of Mr. Bryan's works reveals the following train of thought: a belief in God is fundamental; upon it rests the influences which control life; consciousness of God gives us a sense of responsibility

in every thought and deed to the creator; prayer, belief in immortality, which is so essential as a restraining influence, with its system of rewards and punishments after death, the spirit of brotherhood, belief in the Bible and in Christ—all rest on belief in God.

"If belief in God is necessary to the beliefs enumerated, then it follows logically that anything that weakens belief in God, weakens man and to the extent that it impairs belief in God reduces his power to measure up his opportunities and responsibilities. If there is at work in the world anything that tends to weaken belief in God . . . it is the duty of all to combat it."

This force he finds actually to exist and he calls it Darwinism, and says: "the Darwinist Doctrine is more dangerous (than materialism) because more deceptive. It permits one to believe in a God, but puts the creative act so far away that reverence for the creator and even belief in him is likely to be lost."

So far the argument is ethical, it is based upon the ethical effect of Darwinism and must be combated from that point of view: but Mr. Bryan was not content to leave it at that; he also argued against evolution from a scientific, or at least a pseudo-scientific point of view. Careful reading of his rather florid and discursive pamphlets unearths four arguments for the refutation of Darwin.

1. "He does not even permit us to indulge in a patriotic pride of ancestry; instead of letting us descend from American monkeys, he connects us with the European branch of the monkey family."

2. "The phrase 'we may suppose' occurs over 800 times

in his two principal works. The eminent scientist is guessing."

3. "If we could divide the human race into two distinct groups, we might allow evolutionists to worship brutes as ancestors, but they insist on connecting all mankind with the jungle. We have a right to protect our family tree."

4. "It is groundless because there is not a single fact in the whole universe that can be cited to prove that man is descended from the lower animals."

That is the case for Bryanism as stated by its chief exponent: let us discuss it awhile. Arguments one and three are interesting for their venerable age: by the spirit they breathe they link Bryan with Wilberforce: and indeed in their curious mixture of liberal and reactionary traits, Bryan and Wilberforce are spiritual twins. Wilberforce sixty-five years ago asked Huxley in a public meeting whether it was "through his grandfather or his grandmother that he claimed his descent from a monkey." To which Huxley replied: "I asserted—and I repeat—that a man has no reason to be ashamed of having an ape for his grandfather. If there were an ancestor whom I should feel ashamed of recalling, it would rather be a man—a man of restless and versatile intellect—who not content with success in his own sphere of activity, plunges into Scientific questions with which he has no real acquaintance, only to obscure them by aimless rhetoric, and distract the interest of his hearers from the real point at issue by eloquent digressions and skilled appeals to religious prejudice!"—Et tu, Bryan!

"The phrase 'we may suppose' occurs over 800 times . . . the eminent scientist is guessing." It is an inspiring thought that some patient Bryanite, intent on finding out how "true" was "The Origin of Species," spent many hours counting its phrases; but it would have been more satisfactory from all points of view if there had been some "we may supposes" in Bryan's own works. Thus when he speaks of the Genesis account of creation as the true, complete and exact account, his reputation for intellectual integrity would have gained, if he had written some such sentence as: "Since, however, as all Bible students know, Genesis contains two separate, distinct and contradictory accounts of the creation, *we may suppose,* that we are not intended to accept their literal truth, but rather to see in them allegories of the truth."

Wisdom is the guesses of wise men, and foolishness the certainties of fools. What Bryan hated is the scientific temper which always examines all sides of a question and treats intellectual difficulties with sincerity: it is easier to deny that any other side exists and to shut down difficulties with the sounding brass of vapid oratory: but truth and difficulty are natural bedfellows.

The only relevant statement—and even here there is no argument—against Darwin is the one that no evidence has been found for his "guess." The reader will find a brief statement of the evidence for Evolution in the next part: it will enable him at least to realise what an ignorant man Bryan was. He romanced with the innocence and abandon of a child: but alas! he was childish rather than childlike.

That Bryan had no scientific competence is a point that

need not be laboured. It was his position in the long tradition of those who would protect goodness from the depredations of truth which is of some importance to Americans to-day. In saying to humanity, "be good, sweet maid, and let who will be clever," he was in excellent company, and we must admit at once that he had a sort of excuse for his attitude. After all truth is the worm at the roots of all moral codes and it is small comfort to those who, ethically speaking, have vegetable minds, that the substance of these moral codes passes into the worm and by the alchemy of growth enables it to put on wings and become a butterfly, symbol of immortality, flying to heaven as perennial virtue instead of remaining anchored to the ground as the cabbage, conventional morality.

As that very great American, Justice Holmes, has said, every idea is an incitement: and Darwin's ideas are an incitement to mutiny against tradition. Realizing this as fully as Bryan, the Inquisition condemned Galileo for saying that the earth moved, in these famous words:

"Whereas, you, Galileo, son of the late Vincenzo Galilei of Florence, aged 70 years, were denounced in 1615 to this Holy Office for holding as true the false doctrine taught by many—namely, that the sun is immovable in the centre of the world and that the earth moves also with a diurnal motion; also for having pupils whom you instructed in the same opinions; also for maintaining a correspondence with some German mathematicians; also for publishing certain letters on the solar spots in which you developed the same doctrine as truth; also by answering the objections which were constantly produced from Holy Scriptures by glozing the said Scriptures according to your own

meaning; and whereas thereupon was produced a writing in the form of a letter, confessedly written by you to a person formerly your pupil, in which, following the hypothesis of Copernicus, you include several propositions contrary to the true sense and authority of the Holy Scripture:

Therefore, this holy tribunal, being desirous of providing against the disorder and mischief thence proceeding and increasing to the detriment of the holy faith, etc., etc.

The proposition that the sun is the centre of the universe and immovable in its place is absurd philosophically, false and formally heretical because it is expressly contrary to the Holy Scripture.

The proposition that the earth is not the centre of the universe nor immovable in its place but that it moves also with a diurnal motion is also absurd philosophically, false, and, theologically considered, at least erroneous in faith."

Let us now return to William Jennings Bryan in his true social significance as representing the force of anti-science. The point at issue is in no way the truth of Darwin: the anti-scientists if they were honest would admit that their objections have nothing at all to do with the accuracy of any scientific hypothesis and that they only use the tentativeness which rightly surrounds all scientific thought as an emotional weapon to flourish against people who hate anything but certainty, and who really believe that it is possible to be certain about anything. Right or wrong we'll have none of him, is their real point of view; we tell children that they were brought by the stork, because we believe that the truth would corrupt them, and we tell them that they are a special creation, because if it were

true that they "came from monkeys," that would corrupt them also.

Moreover, the real danger, as we have seen, of the "Darwinist doctrine" is that it "permits one to believe in God, but puts the creative act so far away that reverence for the Creator and even belief in him, is likely to be lost." We shall consider later whether the idea of a Creator who makes an eternal law out of which all life proceeds, is necessarily less reverent than the idea of one who gives men rudimentary and useless muscles, either for no purpose whatever, or to deceive those predestined to damnation into a belief in evolution: but there is another obvious commentary possible.

If a child has been told that God made him or that the stork brought him and later discovers the natural relationship between himself and his parents, he does not lose faith in God or storks, but in the parents who have lied to him. Similarly if the simple-minded inhabitant of Tennessee wakes up to find that creation works by ascertainable laws of nature, he will not necessarily lose faith in God, but he will certainly lose faith in the Bryans, who misled him: and who moreover stand self-convicted of a need to bolster up their faith with falsehood; to cling to the straw of Genesis, because they built the ship of their faith of rotten timbers.

Doubtless many half-educated folk who cannot see the difference between a philosophic question and a scientific question, will deny God because of Pithecanthropus Erectus, but plenty of people deny him without ever having heard of that celebrated ape-man.

I understand that a Tennessee senator said he knew a lady whose son has been definitely led into the wilderness of infidelity through reading Darwin: one of the leading English rationalists tells how when he was a child he compared two versions of the creation and found them different. He went to his father, a Scotch Presbyter, and said, "here it says that Eve was made out of a piece of the side of Adam and here that she was made out of a rib: which is true"? "The Holy Spirit said it was a rib," was the reply, "and ye have no right to add or to take away from the words of Holy Scripture." Then began the fall to infidelity; and if the son of a Tennessee senator's lady friend had a like upbringing of unenlightened fundamentalism, it is not at all surprising if Darwin went to his head, or rather to a heart famished for want of freedom and common sense. Fundamentalism makes more "infidels" than evolution has ever been able to do.

In an earlier chapter we have seen how the pseudo-religion of the Hannah Mores of the eighteenth century paved the way for the erroneous acceptance of Darwinism as a religion by the hungry sheep whose spiritual pastors had failed to lead them: more even than Wilberforce, Bryan was the Hannah More of our generation, and far more the enemy of true religion than of true science. Again he was part of the age-long force of stupidity which nails up Prometheus to the precipice. Finally we should remember that, as deep calls to deep, so too, stupidity calls to stupidity, and in this New Age of Faith it is the false prophets of pseudo-science who make possible by their manifold error the errors of anti-science.

PART III

THE PLAIN TRUTH

INTRODUCTION

We have now sketched the problem of Prometheus in the New Age of Faith and we have glanced at the two pillars of the house of his bondage, pseudo-science and anti-science. It remains to state very briefly what facts Prometheus has to work on in his effort to emancipate society from its threatened disasters.

Science has to fight against an intangible enemy, namely, slovenly habits of thought. No matter whether it is Wiggam or Lothrop Stoddard or Bryan, the object of their labours is the same, to clothe prejudice in a semblance of truth; the only difference between them is that the first two find "Science" a valuable ally and the last found it the very devil.

The best way of combating slovenly habits of thought is to indulge in a little clear thinking and to fortify it with a few clear facts: that is why it was thought best to draw a sharp line between an account of the so-called facts of science as given by the pseudo-scientists and the facts themselves: the three chapters which follow contain nothing but the generally accepted scientific data of human biology.

The reader who, quite rightly, finds that these pages are too incomplete and condensed to satisfy him should purchase Professor H. H. Newman's brilliant compilation

"Readings in Evolution, Genetics and Eugenics" published by the Chicago University Press.

After reading the data with which science furnishes us, we return in the concluding chapter to a survey of the whole problem and a summary of the lessons we have learned.

CHAPTER I

THE PLAIN TRUTH ABOUT EVOLUTION

§ 1. PHILOSOPHY, RELIGION AND SCIENCE

SCIENCE neither proves nor disproves the existence of God, because science does not treat with the problem at all. "In the beginning God created . . ." is a phrase which has a great many possible meanings, but science is not the branch of knowledge which concerns itself with stating what meaning is the true one. The beginning and the nature of God or the "First Cause" are studied in two ways, first by logical reasoning with which men attempt to find out the truth about them, and to define this truth clearly by considering other simpler things about which they are more certain: that is the method of philosophy; second, they can be studied and their existence understood and accepted by taking on faith a body of revealed knowledge about them: that is the method of religion. No third way exists.

Unfortunately men have always tried to find a third way; to find evidence of the existence of God in the universe as we know it; and this attempt it is which has caused the so-called war between religion and science. Thus, some people have always had to strengthen their

faith by some such train of thought as this: the sun is warm, it warms me, therefore the existence of the sun proves that there is a God who cares for me. Since Galileo's statement that the sun does not go round the earth and busy itself with warming it, but that instead the earth is a miserable particle of matter hurrying round the sun with other such particles, shakes this belief that the sun exists especially to warm Christians, their faith when based on so flimsy an idea is likely to be shattered and the Inquisition protects them by suppressing the truth.

So too with such a train of thought as this: shells are found in the high hills, therefore there must have been a flood to carry them there, therefore the Bible is true, therefore God exists. Science, by explaining the truth about fossils, destroys this argument and the foolish people who accepted it cry out that science is the enemy of religion.

In short science does certainly destroy a great many insufficient and false arguments for the existence of God but that is to its credit and truly religious people should be grateful for the service. Furthermore if there are good reasons for a belief in God, they are to be found outside the branch of knowledge with which science is concerned.

"I frankly confess," says Unamuno, "that the supposed rational proofs—ontological, cosmological, ethical, etc.—of the existence of God, prove to me nothing; that all the reasons adduced to show that a God exists appear to me to be based on sophistry and begging of the ques-

tion . . . And if I believe in God, . . . it is first of all because I wish that God may exist, and then, because he is revealed to me, through the channel of the heart, in the Gospel and in Christ and in history. It is an affair of the heart."

It is necessary to emphasize this once more before presenting a very brief epitome of the evidence for evolution because everyone is influenced by preconceived ideas, and, thanks to the deliberate false teaching of the anti-scientists, most of our minds are distorted from true reasoning.

§ 2. "EVOLUTION," A SCIENTIFIC TERM AND AN EVERYDAY WORD AT THE SAME TIME

People often grumble at scientists for using long words for simple things: but often it is the simple words also used in daily life, which obscure the true meaning of science, when they are used by scientists for a special purpose. Good examples of this are especially common in the science of psychology, which uses a great many everyday words, such as emotion, desire, will, feeling, perception, thought, and gives to them a more exact definition and a more restricted use than they have for the man in the street. As a result though the psychologist may seem easier to understand, he is often more difficult to understand than the mathematician or the physicist, who uses strange unfamiliar words of his own making.

In the same way *evolution* has a special meaning for the biologist, which is rather different from the general mean-

ing which it has for the man in the street; and there is a third meaning which it has assumed in some people's minds through misunderstanding and prejudice. "Evolution means that you think men come from monkeys" is a good example of this third meaning with which we need not bother ourselves at present.

What does the biologist mean and what does the ordinary man mean by evolution? In its fullest sense evolution is simply a longer word for "change"; not that we can always use it for change however; if the day began fine and ended wet we would not say the weather evolved into wet. Evolution is change which comes from growth; we talk of the evolution of the Greek Drama, meaning the way in which Greek Drama changed and grew and we imply that all the changes grew out of the earlier stages, that they took place because the earlier stages had existed. We talk of the evolution of human society, meaning that our social customs have changed in accordance with known or unknown laws of growth; and we expect to find traces of the earlier customs in the later ones. We talk of the evolution of a person's prose style, meaning that his style has changed and implying that if he had not begun by writing in a special way, it is not likely that he would have ended by writing as he did in later life.

To the biologist this general meaning of evolution is narrowed down to suit the particular problems which interest him. This narrower definition of *evolution is the orderly process of change and growth in consequence of which living beings have constantly taken on new forms,*

until instead of one simple kind of living being, there exist all the different plants and animals that can be found in the world to-day. To believe in evolution means that you believe that there are laws of nature, through the working of which, once life had begun at all, it could change its forms without having to be created or altered by any force outside nature.

The biologist tries to explain neither how life began, nor how inanimate nature began. Organic evolution does not attempt to solve these problems but tries only to show how life, once it had begun, changed and grew.

§ 3. COMMON DESCENT

In this narrow sense, the theory of evolution is the same as the theory of common descent: that is, the theory that all animals have a common ancestor. The Eskimos have a legend, about a being who was thrown out of a boat; when it tried to climb in, the occupants cut off first fingers, then hands, then arms, and out of each set of joints a different kind of sea-animal was created. That is a theory of special creation, each kind of sea animal had a separate beginning, they were not related one to another.

The theory of special creation or the theory of common descent must one or the other be the true one. Can we prove that one or other is true? The theory of special creation, that a Creator or creative force, consciously thought out, planned and built a dog, a cat, a worm, a spider, an elephant, a man, cannot be scientifically

proved nor disproved because it deals with certain ideas outside the realms of science, such as the idea of a Creator and of a beginning. Science cannot say, does not want to say, what happened "in the beginning."

Therefore the belief in special creation rests upon faith; Eskimo faith, Zuni faith, Hebrew faith, it matters not which; and nobody can attack the faith of our fathers so far as the creator or the beginning is concerned. But the biologists have collected an enormous body of facts which lead them to say: "our facts suggest that it would be simple and rational to suppose that whatever happened at the creation, whatever Creator there was and is, after the creation the created being, life, could go on and did go on of itself, naturally and without any supernatural interference, until the world was populated as it is to-day." "When I first came," says Sir Charles Lyell, "to the notion of a succession of extinction of species, and creation of new ones, going on perpetually now, and through an indefinite period of the past, and to continue for ages to come, all in accommodation to the changes which must continue in the inanimate and habitable earth, the idea struck me as the grandest which I had ever conceived, so far as regards the attributes of the Presiding Mind."

In short, the theory of evolution does not necessarily alter any idea about the Creator, but only about His creation, which according to evolutionists was not tigers, spiders, jelly-fish and fleas but a grand law which once and for all made all the multiple forms of life capable of coming into existence in due course.

§ 4. DARWIN'S EVIDENCE FROM GEOGRAPHY

The idea of special creation cannot be proved, but the theory of common descent, since it has no foundation in religious traditions or authority, must stand or fall by the evidence on which scientists rest it. The theory is as old as the Greeks at least, but the man who produced the overwhelming body of facts, which are evidence for it, was Darwin, and since it was Darwin's body of facts which made the theory acceptable to the scientific world, we call it the Darwinian theory.

What evidence is there for a theory of common descent? Darwin as a young man went round the world in the Beagle, as ship's naturalist, and one of the things which struck him most forcibly was the way in which animal and plant life was distributed over the face of the world. Especially was he struck by the plants and animals of the Galapagos Islands five hundred miles from the west coast of South America. "Here," he wrote later, "almost every product of the land and of the water bears the unmistakable stamp of the American continent. There are twenty-six land birds; of these, twenty-one, or perhaps twenty-three, are valued as distinct species, and would commonly be assumed to have been here created, yet the close affinity of most of these birds to American species is manifest in every character, in their habits, gestures, and tones of voice. The naturalist, looking at the inhabitants of the volcanic islands in the Pacific, distant several hundred miles from the continent, feels that he is standing

on American land. Why should this be so? Why should the species which are supposed to have been created in the Galapagos Archipelago, and nowhere else, bear so plainly the stamp of affinity to those created in America? There is nothing in the conditions of life, in the geological nature of the islands, in their height or climate, or in the proportions in which the several classes are associated together, which closely resembles the conditions of the South American coast; in fact, there is a considerable dissimilarity in all these respects. On the other hand, there is a considerable degree of resemblance . . . between the Galapagos and Cape de Verde Archipelagos, but what an entire and absolute difference in their inhabitants! The inhabitants of the Cape de Verde Islands are related to those of Africa, like those of the Galapagos to America. Facts such as these admit of no sort of explanation on the ordinary view of independent creation; whereas in the view here maintained it is obvious that the Galapagos Islands would be likely to receive colonists from America, and the Cape de Verde Islands from Africa; such colonists would be liable to modification—the principle of inheritance still betraying their original birthplace."

In short, an enormous body of evidence collected by Darwin, A. R. Wallace and others shows that the geographical distribution of plants and animals can be explained by the theory of common descent, while it cannot be explained at all by the idea of a special Creator. Of course it is possible to believe that the Creator, to gratify a personal whim, so arranged His creations that they would inevitably deceive an observant naturalist; but

that does not enhance the dignity of our idea of a Creator.

§ 5. THE TESTIMONY OF THE ROCKS

The existence of myriads of fossils in every cliff and quarry has never failed to attract human notice and hundreds of years ago learned treatises were written to explain their presence. The favourite theory was that they had been deposited in their present position by the waters of the flood, and, indeed they became important evidence from the "fundamentalist" point of view that there really had been a world-wide deluge.

The theory of common descent of all animals from a single ancestor requires confirmation from what we know of all these extinct forms; as Huxley said "the primary and direct evidence in favour of evolution can be furnished only by palæontology [the study of fossils]. The geological record, so soon as it approaches completeness, must, when properly questioned, yield either an affirmative or a negative answer."

Since Huxley, a great deal of evidence has been collected from the rocks, and, though we find ourselves nowhere near a complete record, thousands of observed facts lend their support to a general belief in evolution. Let us mention as an example the well-known fossil history of the horse's ancestors. A succession of horse-like animals have been dug out of the rocks, each fossil showing gradual development from an animal eleven inches high with four toes and a half developed thumb, to the modern horse of our own day. "The course of their evolution," we are

told, "has evidently been determined by the development of extensive, dry, grass-covered, open plains on the American continent. In adaptation to life on such areas structural modification has proceeded in two directions. The limbs have become greatly elongated and the foot uplifted from the ground, and thus adapted for rapid flight from pursuing enemies, while the middle digit has become more and more important and the others, together with the ulna and the fibula, have gradually disappeared or become reduced to mere vestiges. At the same time the grazing mechanism has been gradually perfected. The neck and head have become elongated so that the animal is able to reach the ground without bending its legs, and the cheek teeth have acquired complete grinding surfaces and have greatly increased in length to compensate for the increased rate of wear. As in so many other groups, the evolution of these special characters has been accompanied by gradual increase in size. Thus Eohippus of Lower Eocene times, appears to have been not more than eleven inches high at the shoulder, while existing horses measure about sixty-four inches, and the numerous intermediate genera for the most part show a regular progress in this respect.

"All these changes have taken place gradually, and a beautiful series of intermediate forms indicating the different stages from Eohippus to the modern horse have been discovered. The sequence of these stages in geological time exactly fits in with the theory that each one has been derived from the one next below it by more perfect adaptation to conditions of life."

In short, evidence from extinct forms of life suggests

that through past ages form after form has appeared, lived and died and given way to a more satisfactory form. It is quite possible to believe of course that each was a special creation, but if so the Creator has imitated exactly what we would expect to find if each successive horse-like animal had evolved out of the last by the working of some natural law as yet unexplained.

§ 6. EVIDENCE FROM ANATOMY

When men first tried to fly they made gliders and wings after the fashion of a bird, assuming that as the object, flight, was the same in both cases, so the means would be the same. Some of the earlier motor cars, which took the place of horse-drawn carriages, were built in an ugly and inconvenient model, with a sort of coachman's box for the chauffeur; the wheels too began by being carriage wheels and took time to "evolve" into motor car wheels.

Now let us consider three animals, the whale, the bat and man; all three are called mammals because they give suck to their young. One flies, one swims and one uses his forelimbs for innumerable special and delicate operations. Outwardly a whale's flipper, a bat's wing, and a man's hand are not much alike; within the skin and flesh however we find exactly the same fingers and bones, modified in size and shape, but clearly the same in general design.

If the bat, the whale and man are special, separate creations, we must suppose that the Creator's mind

worked as did the man who invented a flying machine with wings like a bird, or the man who made an automobile with a horse coachman's seat. "We must suppose," as Romanes put it, "that the Deity formed an archetypal plan of certain structures, and that he determined to adhere to this plan through all modifications which those structures exhibit. But if so, why is it that some structures are selected as typical and not others? Why should the vertebral skeleton, for instance, be tortured into every conceivable variety of modification in order to subserve as great a variety of functions; while another structure, such as the eye, is made in different sub-kingdoms on fundamentally different plans, notwithstanding that it has throughout to perform the same function? Will any one have the hardihood to assert that in the case of the skeleton the Deity has endeavoured to show His ingenuity, by the manifold functions to which He has made the same structure subservient; while in the case of the eye He has endeavoured to show His resources, by the manifold structures which He has adapted to serve the same function?"

According to the theory of common descent the similarities between the bat's wing, the whale's flipper and the man's hand are explained by their all having a common ancestor, while the differences are explained by the ancestral form having been modified in the course of ages to suit life in air, in water and on the ground. Innumerable facts of a like nature are capable of the same explanation.

According to the idea of special creation, we must

suppose that when the Creator came to make a bat, He could not get out of His mind the plan on which He had made a whale; and when He came to make a man, He was still influenced by the same idea which obsessed Him about the bat and the whale. How much grander is the conception of a Creator who made once and for all a law through the working of which came not only the marvellous wing of a bat, so well suited for flying, but the excellent swimming flipper of the whale, and the incomparably useful human hand, all from the same materials. How much grander than the idea of a Creator like a man using the ugly and unsuitable design of a superseded vehicle because He had not yet been able to think out the right design for the vehicle of the future!

§ 7. EVIDENCE FROM QUITE USELESS THINGS

Other evidence from anatomy is even more interesting than that already mentioned. Certain savage implements have two pieces of soft wood spliced together by a piece of dark hard wood. Later these savages found a better way of joining the two pieces which did away with the necessity of the hard wood; but they continued to paint a round dark dot where the old fashioned type had shown the dark end of the hard wood. Doubtless a superstitious reverence for traditional forms was responsible for this idiosyncracy. Animal bodies are full of such rudimentary structures, and about their nature we may once more quote Romanes: "throughout the animal and vegetable kingdoms we constantly meet with dwarfed and

useless representatives of organs, which in other and allied kinds of animals and plants are of large size and functional utility. Thus, for instance, the unborn whale had rudimentary teeth, which are never destined to cut the gums; and throughout its life this animal retains, in a similarly rudimentary condition, a number of organs which never could have been of use to any kind of creature save a terrestrial quadruped. The whole anatomy of its internal ear, for example, has reference to hearing in air, as Hunter long ago remarked, 'is constructed upon the same principle as in the quadruped' yet, as Owen says, 'the outer opening and passage leading therefrom to the tympanum can rarely be affected by sonorous vibrations of the atmosphere, and indeed they are reduced, or have degenerated, to a degree which makes it difficult to conceive how such vibrations can be propagated to the ear drum during the brief moments in which the opening may be raised above the water.' "

The theory of common descent can explain these innumerable rudimentary and useless organs quite simply; the animal has taken to a new way of life and no longer needs them, by disuse they have grown even more useless, but still remain like the dark mark on the savage implement as a reminder of what has been.

Of course the idea of special creation is not disproved by the existence of these useless organs, but the mind of the Creator is put on a level with that of the savage who was so bound by conservatism that he had to go on with things exactly as they had been, even though other changes made such conservatism meaningless.

§ 8. WHAT IS MAN?

So much for the evidence upon which scientists have based the theory of common descent; other important types of evidence exist, but enough has been said for a sufficient comment on William Jennings Bryan's statement that not one particle of evidence has ever been produced by scientists in support of evolution.

We must now consider briefly the position in this theory of the question of man and his origin: for some special creationists are willing to admit evolution for lower forms of life, provided that a special creation is retained for man alone.

The evolutionist replies that there is exactly similar evidence of man's relationship to other animals as there is of the relationship of a whale and a bat, or a dog and a wolf, or a bee and a wasp, and that, though there is nothing to disprove the idea of special creation, simply because that idea is of its very nature not to be disproved by scientific argument, nevertheless it is only logical to apply equal value to evidence affecting man and to the rest of the evidence.

Thus man is a museum of useless vestiges of organs which had quite obvious uses to lower animals; of these a number would be useful to an ape, are indeed useful to apes and monkeys in actual existence, but are quite useless to man. Thus we have muscles which ought to be able to move our ears, but in fact are unable to do so, except in a few individuals; apes have these same muscles, and with them also they are useless, but the lower

monkeys have very serviceable muscles indeed and can move their ears with ease. All apes and monkeys can not only move their eyebrows up and down but the skin of their scalp too; though human beings have a vestige of the muscle which so moves it, only an occasional individual can use it.

Every human being has the vestiges of a tail at the end of its backbone and similar vestiges exist in the apes; but with both the tail has ceased to have any meaning, valuable as it is to lower monkeys, yet in a very few individuals there exist muscles for moving this useless vestige of a tail. Every human being has an appendix, which is often nipped out by the doctor; this is a blind alley attached to the intestines and absolutely without use. Apes also have useless appendices, but when we go to lower animals we find that the appendix is much larger and useful for digestion.

These are but a few of the useless vestiges in man of valuable organs in lower animals; their presence is clearly explained by the theory of common descent, but the special creationist would have to accuse the Creator of deliberately laying false scents to delude the biologist. In the same way general anatomy makes it hard to see why a special case should be made of the human body; everything points to the closest relationship between it and its nearest allies in the animal kingdom. "The force of this latter consideration" says Romanes, "is so enormous that no one who has not studied human anatomy can be in a position to appreciate it. . . . There is no bone, muscle, nerve or vessel of any importance in the one which

is not answered to by the other. Hence there are hundreds of thousands of instances of the most detailed correspondence, without there being any instances to the contrary, if we pay due regard to vestigial characters. The entire corporeal structure of man is an exact anatomical copy of that which we find in the ape."

As far then as we can see from comparing their bodies, man is not free from the characteristics which appear to bind together with ties of blood relationship all other animal creatures whatsoever, so that logic suggests that the same causes and effects operate with him as well. But we must look for corroboration to palæontology; since, as we have seen, "if evolution has taken place there will its mark be left; if it has not taken place there will lie its refutation."

§ 9. MISSING LINKS

Second only to mothers-in-law as raw material for jokes and vacant laughter, the missing link has taken a firm and fictitious place in the minds of the ill-informed. People who would think themselves ignorant and uncultured if they did not know something about art, literature and politics will ask with a hysterical giggle "have they discovered the missing link yet?" and the answer is, yes they have discovered the missing link, several of them indeed.

When Darwin wrote the Descent of Man he had practically no evidence of human fossils upon which he could work, no sub-human forms had been discovered to lessen

the distance between man and his nearest relatives, the apes. Since Darwin his work and theories have been corroborated by the discovery of several such links.

First, there is the famous skull of the Java ape-man, Pithecanthropus Erectus, as he has been called. The remains are of a being who lived half a million years ago and walked upright; he had a brain two-thirds that of man and he was a very low-browed; he was not our direct ancestor but a distant uncle, sub-human, yet higher than the apes and a link, though not a direct one between the two.

Next, there is the Heidelberg man who lived rather more than three hundred thousand years ago; the following is Osborn's description of his jaw-bone; "the mandible shows a combination of features never before found in any fossil or recent man. The protrusion of the lower jaw just below the front teeth (the chin prominence) which gives shape to the human chin is entirely lacking. Had the teeth been absent it would have been impossible to diagnose it as human. From a fragment of the symphysis of the jaw it might well have been classed as some gorilla-like anthropoid, while the ascending ramus resembles that of some large variety of gibbon. The absolute certainty that the remains are human is based on the form of the teeth,—molars, premolars, canines and incisors are all essentially human and although somewhat primitive in form, show no trace of being intermediate between man and the anthropoid apes but rather of being derived from some older common ancestor."

Besides these there are numbers of other remains, the

Piltdown skull, the Neanderthal skulls, the Rhodesian remains, all of them contributing further evidence of links between man and the nearest living animals. Their combined testimony is as strong as or stronger than that already given of the evolution of the horse, and there can be no reason at all for excluding man from the general theory of common descent.

§ 10. MEN AND MONKEYS

It is the misfortune of biologists, and of scientists in general, that hysterical old orators like Bryan are unable to read, or unwilling to repeat accurately what they have read. Hence it will be necessary to waste a few words in repeating that scientists do not suggest that men are directly descended from monkeys or any other living animal.

What they do say is that if you climb sufficiently far down your family tree you will find a monkey sitting on the end of one of the branches; where that branch joins the main trunk you will find an extinct, unknown, "missing" animal which is the common ancestor of yourself, as a representative human being, and the monkey.

This should give no comfort to any Bryanist, though it seems to satisfy the legislature of Tennessee, who have adopted a text book which states the above fact in less picturesque terms, namely that man is not descended from any living animal. We hope it will be as unpleasant for fundamentalists to have a monkey for aunt, as it seems to be for them to have one as grandmother, mistakenly so-

called. But for the sake of accuracy the layman should remember the fact as stated.

§ 11. HOW DOES THE LAW WORK?

Grand as is the perspective of geological evolution we can find just as valuable evidence that a great many different forms have all come from one ancestor in the restricted area of the farm-yard, the pigeon-loft and the flower garden.

We know, for example, that all the manifold varieties of domesticated pigeons, have come from the simple wild wood-pigeon; that men bred these birds and selected varieties which pleased them, until by selective breeding all sorts of apparently new shapes, sizes and colours were obtained. The same is true of cats and chickens, sheep and pigs; the cart horse and the race horse, the Pekingese pug and the Alsatian wolfhound and many another incongruous pair are plain evidence of evolution from a common ancestor of vastly different forms. And this evolution is brought about by artificial selection and breeding.

Darwin appreciated the importance of that fact and looked about to see if he could find in nature anything which could take the place of artificial selection in the breeding of the varieties of domesticated animals. If artificial selection by breeding could produce the cart horse on one hand, the race horse on the other, or the Pekingese and the Alsatian, why should not even more different species in nature come about by a similar method carried on over a vastly longer period of time?

This is the starting point from which Darwin tried to attack his second great problem, how to explain the origin of so many species supposing that they were all descended, as the first theory showed, from a common ancestor.

Judd tells us exactly what happened in Darwin's mind: "Darwin happened to read the celebrated work of Malthus (On Population) for amusement, and this served as a spark falling on a long prepared train of thought. The idea that all animals and plants multiply in geometrical progression, while the supplies of food and space to be occupied remain nearly constant, and that this must lead to a struggle for existence of the most desperate kind, was by no means new to Darwin, . . . yet the facts with regard to the human race, so strikingly presented by Malthus, brought the whole question with such vividness before him that the idea of Natural Selection flashed upon Darwin's mind."

§ 12. WHAT IS NATURAL SELECTION?

What is Natural Selection? It is that which produces in nature the same increase of different forms of life, as the artificial breeders can produce in the farm-yard and the flower garden; only as the field is wider and the time vastly greater, natural selection has produced, not merely new varieties, but new species, new families, new groups of families, embracing the rhinoceros, the ant, man and the vulture in one great related whole, the animal kingdom, all with a common ancestor.

Common observation shows us that offspring resemble their parents but with a tendency to vary; why this should be was not considered by Darwin, he accepted it as a clear fact upon which to work.

Next, far more individuals are born into the world than can possibly find food or space to keep them alive long enough to have offspring. Since the desire to survive in order to have offspring is the basic urge of all life, a struggle results for food and a place in the sun. In this struggle the individuals who happen to be born with variations of form, habit, ability, which help them to win, will survive to have offspring, and those offspring will in turn inherit the useful variations.

In time, through the simple operation of the struggle for existence, new varieties, and later new species, better adapted to struggle with their environment will appear and establish themselves; and the origin of species is explained.

But even here there is room for misunderstanding: when we say with Darwin that the origin of species can be accounted for by natural selection we do not mean that we have any nearer understanding how it is that new characters, new varieties, new forms arise; we only know that they do, we accept the fact without seeking to explain it, and content ourselves with explaining how once they have arisen, they can be picked and chosen and perpetuated by means of natural selection.

Before we study briefly some of the difficulties which arise when we consider natural selection closely, it is important to emphasize the independence of the theory

of evolution or common descent from the theory of natural selection; the second is an attempt to explain the first, and if it proves inadequate explanation that does not in any way impair the truth of what it tries to explain. Many scientists dispute the adequacy of natural selection, but no scientist disputes evolution. As it is possible to dispute Newton's explanations of why the apple fell to the ground, but impossible to dispute that the apple does fall to the ground; so with natural selection and evolution.

§ 13. DIFFICULTIES

We cannot do more in this book than give a brief outline of some of the difficulties which exist in Darwin's theory of natural selection so as to indicate what is still controversial.

In the first place there is the question of the inheritance of acquired characteristics: as we saw in Part II this is a thorny subject and for the purpose of criticising the pseudo-science of A. E. Wiggam we found it sufficient to accept his categorical denial that acquired characterisitics are inheritable. The position is not so easy however.

Before Darwin Lamarck had explained the acquisition of a long neck by a giraffe by suggesting that giraffes always stretched their necks higher and higher to get food and that the stretchings were inherited by the next generation, who began life as a result, with a longer neck and ended it, in the same way, with a still longer.

"Heaven defend me," said Darwin "from Lamarck's nonsense," but he called on deaf ears; and in his work we find constant resort to a belief in the inheritance of acquired characteristics. He believed that variations started in the body cells and found their way to the germ plasm by means of "gemmules," which however do not exist. A good example of how the inheritance of acquired characteristics is tacitly admitted by Darwin is the case of the whale's hind legs. "Darwin's explanation," says Professor Newman, "would be that under aquatic conditions the first whale ancestors would be handicapped by hind legs and that any decrease in their size, which would be enhanced by disuse, would be of advantage. This might seem reasonable during the main period of limb reduction, but, after the limb is reduced to a subcutaneous rudiment, there could be little advantage in carrying the rudimentation still further."

Let us turn back to the giraffe's neck for a moment; Darwin believed that the giraffe got its neck as a result of the struggle for existence, the longest neck could be most certain of reaching the food and therefore in the long run those giraffes which happened to have got by luck a long neck were ones which had offspring, with, of course, their parents' long necks. The explanation fits the giraffe's neck, but not the whale's leg because it does not matter at all to the whale whether it has or has not legs under the skin so far as the struggle for existence is concerned and so it is hard to see why their offspring should have inherited ever dwindling remnants, unless the Lamarckian explanation is correct that they inherited

legs which had grown even smaller through disuse, that is, an acquired characteristic.

Moreover, a great many varieties exist, which have no survival value, so far as we can see: assuming that survival value is at least the chief cause why variations persist, how can we explain this?

Moreover, if variations are gradual, how have the complicated instincts and adaptations like the electric organs of fish been evolved? An instinct has no survival value unless it is complete, nor has the electric organ; how then have they been built up out of small, incomplete, useless variations?

Various explanations of such difficulties have been suggested and some of these will be referred to in the chapter on heredity: it suffices here to say that though Darwin's natural selection theory has been much modified by increased knowledge since his day, nevertheless it remains as a basis upon which we have to build our knowledge of how evolution works. Our increased knowledge of the physical basis of heredity, about which Darwin knew absolutely nothing, has given us a new line of attack on the problems which he left unsolved.

CHAPTER II

HEREDITY AND SOCIOLOGY

§ 1. COMMON SENSE

If a book by a heredity fiend is attacked the listener is almost certain to reply: "Well, there must be something in heredity, children do take after their parents." Common sense does indeed tell us that there is "something in heredity," but it is imperative that we remember that common sense must be turned into organized common sense, before it can be accepted as science, or used to control events.

The great difficulty about organizing common sense about heredity is that it is so hard to isolate the effect of heredity from that of environment. Indeed this difficulty is responsible for so much misunderstanding and so much false reasoning that it will be valuable to begin with a few examples of its influence.

Common sense about children taking after their parents in mental qualities is almost always useless for scientific argument. Children are apt to "take after" anybody with whom they come into contact however slight. Not only are mannerisms imitated at once, but values are accepted, and enthusiasms adopted at very early ages and often as a result of the most casual occurrences.

Common sense about culture and mode of life in communities being due to physical heredity is even more completely useless to the scientist. "In Rome do as the Romans do," is a rule which is obeyed by tourist and Italian citizen alike, by the first through imitation as an adult, by the second equally through imitation but from the earliest childhood.

Common sense about the relative intelligence of social classes being correlated with heredity is utterly misleading. Thus, "in the schools of Milan, Italy, the children of the professional and upper middle classes were found by these tests to be decidedly superior in capacity to learn to those of the artizans, servants, unskilled labourers and street vendors. Of course a few children of the artizan class proved, as they always do, extraordinarily bright. This shows that we must occasionally have a man of genius with ordinary parents"; or "in Brussels, Belgium, the children of the well-to-do were a year and a half ahead of the standard for their age in learning capacity over other children"; are utterly useless as evidence of heredity, because it is clear that in their very nature they entangle environment with the other factor, so that their interpretations are purely arbitrary.

The same objection applies to all conceivable evidence taken from ordinary life: since neither environmental factors, nor inheritance factors are controlled, we have two unknown variables and try to solve them with one equation.

We are therefore forced to go to laboratory experiments with plants and animals for any organized common sense

about heredity, but here again when we try to apply our discoveries to human social problems we are met with a very severe difficulty. With animals biology is all important, psychology negligible: with man psychology is far more important than biology. Society is chiefly interested in what he does with his mind, and is only interested in his body in so far as it controls this.

Now psychological qualities and their application have little to do with heredity: potentialities may have everything to do with heredity, but it is not heredity which turns the individual potentiality in the direction of being a good bishop, rather than a good actor, or a good burglar. We must therefore be careful about applying laws or facts about biological heredity to psychological phenomena.

Granted I get my brain from my parents, I do not get from them the innumerable stimuli which are to shape its product. We get two raw negatives from a photographic dealer and one may be faster than the other, or they may be both the same, but it is the subject we impress upon them when we take the photograph which really interests our friends.

After these preliminary remarks let us examine the known laws of heredity.

§ 2. MENDEL

Common sense tells us that children are like their parents, but that they vary from their parents. This is true of all plants and all animals including man, as far as physical qualities are concerned, and for all we know,

for psychological qualities as well: but, owing to the great difficulty of distinguishing the effect of environment from the effect of heredity, we must have an open mind about psychological qualities. We must begin with purely physiological qualities and after we have ascertained all that is known about their inheritance we must see how much of it is applicable to the other.

The first definite scientific knowledge about the *laws* of heredity, as distinguished from the *fact* of heredity taught us by common sense, was the result of careful breeding experiments. In order that we may find out true laws about inheritance we must know exactly the qualities of the parents; we never know this in actual life because all individuals carry in them the latent characteristics of their ancestors, and our calculations may be upset by something latent in a person of which we are ignorant: hence we shall always be uncertain unless we can isolate the stock and prove it "pure" by controlled breeding.

So long ago as 1866 Gregor Mendel, an abbot, published the results of his experiments in controlled breeding of peas. His essay was forgotten and not rediscovered until sixteen years after his death. In 1900 three different scientists discovered it independently and its importance was at once recognized.

Mendel took a pea with a tall stem and fertilised its seed with pollen from a pea with a dwarf stem: he had proved that each pea bred true to its character whether tall or dwarf by careful sowing of several generations. He took the seed thus fertilised and sowed it. He found

that all the plants which grew from the seed had tall stems. He fertilised the seed of these plants with their own pollen and sowed the grandchildren of the original seeds. One thousand and sixty-four plants came up and of them three-quarters were tall and one-quarter were dwarf.

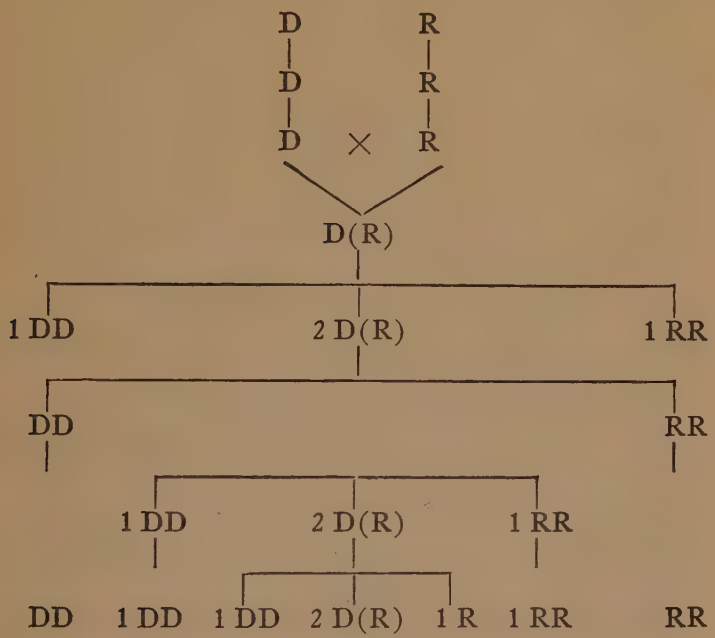
In the same way he took peas with other marked characters, crossed them and sowed several generations; and in all cases he found that one character disappeared altogether in the first generation and reappeared again in the subsequent generations in the proportion of one out of every four individuals.

He called the character which dominated the first generation a dominant and the character which receded, as it were, into the individual, the recessive; and he formulated the general law that when an individual with a dominant character is mated with an individual with a corresponding recessive character, the offspring of the first generation will all show the dominant character, while in the next generation dominants will appear in the proportion of three to one.

Moreover in this generation where the proportion of dominant tall peas to recessive dwarfed peas is three to one, one in three of the tall will breed true to tallness forever, all the recessive dwarfs will breed true to dwarfness forever, and two out of three of the tall will breed both tall and dwarf in the proportion of three to one and so ad infinitum.

The diagram will make this simple point clearer: D is a tall dominant pea, R is a dwarf recessive, they are

crossed and produce offspring all of them being D but having hidden in them the potentiality of producing R. That is, all this generation is tall. In the next generation



produced by self-fertilising these plants out of every four individuals one DD will be tall, with the capability of producing only tall peas as offspring, one will be dwarf, RR, with the capability of producing only dwarf peas and two will be tall 2D(R), but capable of producing both tall and dwarf peas in the proportion of three to one: and so ad infinitum.

Since Mendel it has been found that large numbers of animal and plant characters follow the same rule, and the knowledge has proved useful to farmers and agriculturists in many ways.

From his practical discovery Mendel showed that three theoretical results followed, and it is of importance for us to remember these results. First, if a pea is tall, it does not matter what other characters it may have of colour or shape, it will act the same in inheritance for its tall character. Tallness is independent of any other character. "The character of tallness from a tall plant with wrinkled seeds or purple flowers will act just the same as from a tall plant with smooth seeds or white flowers. Tallness is a unit and its behaviour in inheritance is independent of all other units." This is called the theory of independent unit characters.

Second is the theory of dominance: whereby some characters though present in the germ cell cannot express themselves so long as another character is present to frustrate them. It should perhaps be mentioned that further research has somewhat modified Mendel's theory here; but not in anyway so as to affect the general results from the layman's point of view.

Third is the theory of the purity of the gametes: this is very simple but very important. A gamete is an egg or ovum or seed, or a pollen grain or spermatozoon. All the seed or pollen of a pure tall pea has in it the factor which will produce tallness and all the seed or pollen of a pure dwarf pea has in it the factor which will produce dwarfness. As we have seen the cross between

seed with the factor for tallness and pollen with the factor for dwarfness produces tall plants with the potentiality to produce some dwarf offspring. What factors have the seed and pollen of these hybrids? They do not have both factors, but some seed and some pollen have the factor for tallness and some the factor for dwarfness.

What happens when these plants are fertilised? Tall seed and dwarf pollen, dwarf seed and tall pollen, tall seed and tall pollen, dwarf seed and dwarf pollen will mingle on the average in equal proportions so that using D for tall and R for dwarf, there will be an equal number of four types of individuals, DR, RD, DD, and RR.

Now because of dominance any individuals with one or more factors for tallness will be tall and we get the proportion of 3 to 1 already found in practice. Moreover the DD and RR individuals will breed true forever, the opposite character having been bred out, leaving half the individuals, the DRs and the RDs to continue breeding in the same way a ratio of 3 talls to 1 dwarf. In short D or R is found in every gamete but never both D and R.

§3. MENDELISM AND MAN

Mendel's laws tell us all we know about the proportions in which certain characters of parents appear in offspring. Is his knowledge valuable from the point of view of human social problems? For as readers will remember that claim has been made by certain pseudo-scientists.

In the first place it depends upon what human char-

acters prove to be Mendelian: if it was found, for example, that a passion for homicide was a recessive Mendelian character, it would be worth while to try and breed it out. Let us then look at a list of human characters that have been shown to behave like tallness and dwarfness in peas.

Eye colour: is the only normal human character shown to follow Mendelian laws. The type of eye in which pigment is present on the front of the iris is dominant; absence of such pigment is recessive; or in other words brown eyes are dominant to blue eyes and if a man with pure brown eyes marries a woman with pure blue eyes all their children will have brown eyes and their grandchildren brown eyes in the proportion of three to one.

Brachydactyly: or unusually short and stumpy figures.

Cataract: when this eye disease is congenital and not acquired.

Tylosis palmaris et plantaris: a thickening of the skin on the palms of the hand and the soles of the feet.

Epidermolysis bullosa: a skin condition which makes one blister easily.

Xanthoma: or yellow patches on the skin.

Multiple Teleangiectasis: or spots on the skin.

Monilithrix: a nodose condition of the hair.

Hypotrichosis congenita familiaris: or premature baldness appearing in infancy.

Porokeratosis: a curious disease in which a raised horny ridge appears on the skin, spreading centrifugally,

leaving behind it a patch in which the constituents of the skin undergo a partial atrophy.

Enlarged spleen.

Night blindness.

Distichiasis: a development of eyelashes in place of glands on the inside of the eyelids.

Ptosis: or drooping of the upper lip.

Coloboma: a congenital defect in the iris of the eye.

Ectopia lentis: another eye trouble.

Hæmophila: or easy bleeding.

Colour blindness.

To this strange list Major Hurst would add musical ability as a recessive, and some cases of feeblemindedness seem to follow the same laws.

What then are we to say about the practical value of Mendelian laws for the sociologist and the politician? In so far as they represent nearly all we know about heredity, how far do they stimulate us to a hope in eugenics?

1. The above list shows how unimportant to the sociologist are the positively known human traits, which obey Mendelian laws.
2. The theory of independent unit characters does away altogether with the hope of any practical application of the science of heredity, because a man does not inherit his parent's *"character"* good or bad, but merely *some* out of thousands of *characteristics*.
3. The phenomenon of dominance means that if in any particular case a man has or has not a valuable quality, we know nothing whatever about its presence

or absence in his germ plasm. If genius and madness were really linked and inheritable, the offspring of genius might be madness.

4. Since we cannot in life be sure that we are breeding from pure stocks, the element of chance for the eugenist would be as great as that appertaining to ordinary uncontrolled mating.

§ 4. MUTATIONS

What else has the science of heredity to tell us beside the Mendelian laws, which in spite of their fascination for the pure biologist have little meaning for the sociologist?

One of the most important discoveries in modern biology was that by Hugo de Vries of "mutations." In a field in Holland de Vries discovered a quantity of Evening Primroses growing, and he watched them carefully for several years. In the second year he noticed two perfectly distinct and new forms of the plant, which he transplanted in his own garden and propagated by sowing their self-fertilized seed. All in a moment two new plants had arisen and when the seeds came up the new plants were found to breed true.

This discovery modified previously held ideas profoundly: Darwin and all the older biologists had believed that variations were minute and that new forms came of small variations accumulated through several generations; but here was evidence that a new species might jump into existence at once.

Professor T. H. Morgan by patient and careful breeding of the fruit fly, drosophila, has been able to establish beyond any doubt that mutations are a common element in the appearance of new species and that "natura facit nihil per saltum" is untrue, nature makes many things in jumps.

The consequent importance to evolutionary theory is enormous and the mutation theory helps in removing several difficulties; but the practical application by man of the laws of heredity is by no means simplified by the discovery. The noteworthy characteristic of a mutation is that its advent is completely unheralded; it just appears. Mutations therefore cannot be controlled.

It was not until de Vries and Luther Burbank made the practical importance of mutations widely known that scientists realised that Darwin had been mistaken in part in his interpretation of human methods of breeding plants and animals: it is now realised more fully than in Darwin's day that some of the most important triumphs of domestication, notably in the discovery of new types of wheat, have been due to careful search for sudden mutations, rather than patient breeding from small valuable variations. The breeder or the agriculturist cannot always dictate his wishes, he must await chance happenings and his success depends on his taking the chance when it is offered.

What is the lesson for social problems? In the first place we do not know whether there are mutations or not in human beings, so that the lesson is probably purely metaphorical, namely, to create such an environment

that new qualities are recognized, fostered, and honoured rather than standardized out of existence by strict laws of social conformity. At any rate the work of de Vries and Morgan gives no more positive support to the contentions described in Part II of this book, than does the work of Mendel.

Professor H. H. Newman sums up the honest scientist's point of view in the following words: "In bringing his discussion of the causes of heritable variations (mutations) to a close, we find ourselves in a somewhat pessimistic frame of mind. When all is said, it is found that our knowledge of what actually causes mutations is almost nothing. We think we know something about the mechanism of heredity, but we do not know the mechanism of variation. The really great evolutionary discovery of the future will probably be the finding out of the cause or causes of mutations."

In short, the biologist is agnostic about the very meaning and nature of mutations as a biological phenomenon; it needs no argument to suggest that the sociologist need not consider the laws of mutations as affecting any part of his field. Thus Mendelian theories and the work of de Vries, comprising almost all we know about heredity, have only a negative importance for us. What shall we gain from biological knowledge about the mechanism of inheritance, about chromosomes?

§ 5. CHROMOSOMES

Mendel and de Vries represent the main advances in the science of heredity which have come by way of selective

and controlled breeding. To T. H. Morgan we owe our greatest advances in knowledge of the mechanical and physical basis of heredity.

It will be remembered that Darwin started with the assumption derived from common sense and common observation that children were like their parents but varied from them. Mendel and de Vries increased our knowledge of the laws governing these variations and of their nature, but it was not until intensive microscopic research into the contents of the cells which make up living organisms had brought forth fruit, that we knew anything about the machinery by which these laws were carried out. Fascinating as this part of biology has become, we must content ourselves here with an outline of those data which have a sociological meaning.

Every cell of every living being contains a definite and constant number of particles, called chromosomes, because they can be easily seen when they have been made to absorb certain colouring stains. In every living being half the chromosomes in each cell have come from the mother and half from the father by an elaborate process of splitting and growth. The ripe seed and spermatozoon are exceptions to the general rule of the constant number of chromosomes: in the course of a series of changes they get rid of half their chromosomes, so that at the moment of fertilisation, when the new being begins its life, there shall be only the normal number of chromosomes and not double that number, as would happen if the number had not been previously reduced.

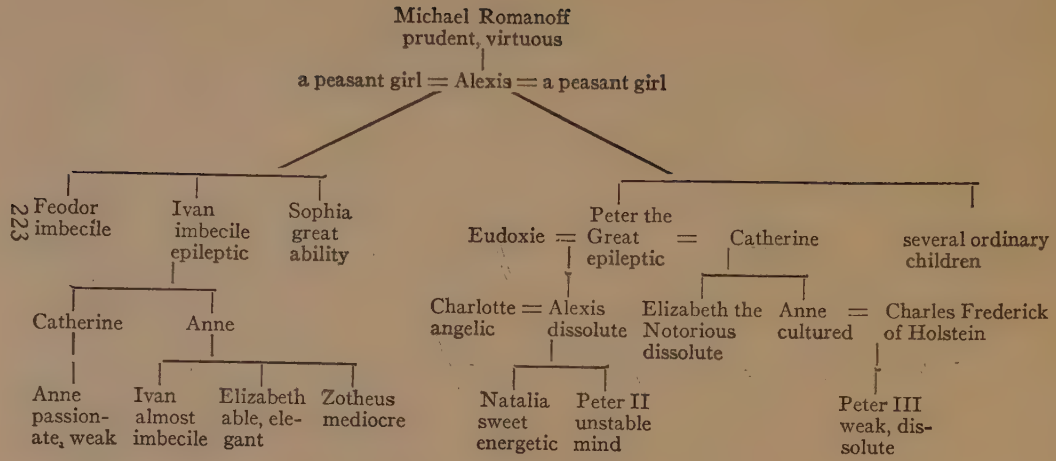
The importance of these chromosomes is that they can

be shown to be the physical means whereby the Mendelian laws are carried out: they are the bearers of the unit characters and by watching their behaviour we can actually see why Mendel's experiments turned out as they did. As eugenics is the sane control of heredity, it is clear that only in so far as eugenics can find a way of controlling the chromosomes can it have value. This point has been discussed however in the previous sections and need not be reconsidered here: it suffices to say that all our knowledge of the behaviour of chromosomes strengthens the sociologist in his distrust of all schemes for the control of heredity. It almost seems as if nature has elaborated a fool-proof machinery designed to give uninterrupted play to the laws of chance and incapable of any sort of conscious tampering.

Knowledge of what elements exist in the sun, will never enable us to make the sun set an hour sooner, and knowledge of the chromosomes leads to a similar negative standpoint. No man by taking thought can add a unit to his chromosomes, but he can control the functioning of the complete organism, which they build, by use of that non-heritable, environmental function called thought.

§6. SOME HUMAN PEDIGREES

People have hoped to produce valuable data from the study of human pedigrees, and some of the results of such study are certainly of great interest. We have already seen the remarkable progeny whom Elizabeth


Michael Romanoff
prudent, virtuous
a peasant girl = Alexis = a peasant girl
Feodor imbecile
Ivan imbecile epileptic
Sophia great ability
Catherine
Anne
Anne passionate, weak
Ivan almost imbecile
Elizabeth able, elegant
Zotheus mediocre
Eudoxie = Peter the Great epileptic = Catherine
several ordinary children
Charlotte angelic = Alexis dissolute
Elizabeth the Notorious dissolute
Anne cultured = Charles Frederick of Holstein
Natalia sweet energetic
Peter II unstable mind
Peter III weak, dissolute

Tuthill brought into the world; on the preceding page is the genealogical tree of Peter the Great of Russia.

A very valuable contribution to the theoretical study of the laws of heredity is certainly to be found in collecting vast masses of similar pedigrees. It is hard however to see what support such data give to the contentions of heredity fiends. The pedigree of Peter the Great shows exactly what we would have expected, bad and good characters inherited haphazard, sometimes together, sometimes apart: Peter the Great is also Peter the Epileptic. Common sense finds it hard to see what sociological import is to be found in such a state of affairs.

§7. HEREDITY AND ENVIRONMENT

To the purely negative value of the knowledge sketched in preceding sections we may add here a single definite example of the greater importance, *from the sociological point of view,* of environment over heredity. Popenhoe and Johnson write as follows: "Emphasis has been given to the desirability of inheriting a good constitution and a high degree of vigor and disease-resistance. It has been asserted that no measures of hygiene and sanitation can take the place of such inheritance. It is now desirable to ascertain the limits within which good inheritance is effective, and this may be conveniently done by a study of the lives of a group of people, who inherited exceptionally strong physical constitutions."

By careful statistical study of groups of long-lived people the authors show that though theoretically people

may inherit the gift of long life, practically this is of little value, for most people die before their theoretical inherited time. They assume that some people may inherit constitutions which could give them seventy years of life, while others can only expect, say, sixty years: but such is the effect of environment that in practice we cannot count on the first group living longer than the second.

"If we were to generalize from this single case, we would have to say that five-sixths of the population does not make the most of its physical inheritance. This is certainly a fact that discourages fatalistic optimism. The man who tells himself that, because of his magnificent inherited constitution, he can safely take any risk, is pretty sure to take too many risks and meet with a non-selective—i.e., genetically, a premature—death, when he might in the nature of things have lived almost a generation longer."

In short, the position is this: theoretically, heredity gives one man a thousand gifts, another two thousand; practically, environment allows one to use a hundred out of his thousand, and the other a hundred and five out of his two thousand. The heredity fiends beat their heads against the walls of common sense and the roof of science in an effort to eliminate all except the two thousand gift individuals: they would do better to tell the sociologists this message: "Biology teaches that in order that an individual may be born, there must be a world into which he may be born: what we know about the individual shows that he may or may not be able to do as well as

another with the opportunities a Utopia would afford, but at least he has the potentiality to do a good deal better than his actual world will allow him, unless you enlarge the opportunities of that world to many times their present size."

To the biologist heredity and environment are one and indissoluble; to the sociologist environment has practical importance while the importance of heredity, small or great, is intangible and uncontrollable.

CHAPTER III

WHAT WE MEAN BY RACE

§ 1. RACES AS CLASSIFICATIONS

THE object of science is to collect all sorts of facts and to arrange them in bundles in such a way that we can find them easily when we want them, and can find out generalisations which help to explain them. Thus if we had several hundred postage stamps, some green, some red and some blue, we might sort them into bundles according to their colour and then if we examined the three bundles we would discover that a general law held good for them: in the green bundle would be stamps of all countries all equivalent in value to an American one cent, the red stamps are all equivalent to the two cents and the blue to the five-cent stamp. We could say that colour in stamps is connected with the face value of the stamps; but we should find some exceptions, certain stamps of a few countries do not conform to this general rule and we would have to explain this. By reference to another group of facts, the documents of international conventions, we would find that certain countries bound themselves to print stamps of certain face values in certain colours and others did not. We should have called in another science to explain a difficulty we had encountered in our own.

Now we might say that a perfect classification must cover all the facts we want to classify and cover them neatly and fruitfully: that is, there must be no stamps left outside the bundles and all the bundles must have a meaning when examined. Perhaps the colour bundles seem therefore unsatisfactory and we look about for other characteristics by which we can sort one stamp from another. We look at the obliterations of the postmark and sort them in order from the lightest postmark to the heaviest. We would find that this had to be abandoned because it told us nothing about the stamps, it would be purely artificial and even then it would be useless because it would not have the simple advantage of helping us to find them quickly.

Finally after all sorts of possible arrangements had been tried we would probably finish up by sorting the stamps by countries—that is, a geographical classification which in the case of the stamps would be the best from all points of view.

That is in brief what every science has had to do with its data, find the most fruitful and intelligent order in which to group them; and usually each separate science has had to begin with an artificial classification—that is, one which merely helps one to find the facts quickly, but does not explain anything at all about them. Now Darwin enabled the biological sciences to pass from these artificial classifications to natural ones by revealing the idea which should be the basis of the arrangement. This idea of course is that of physical relationship and descent through countless generations from a single type. We

can clearly see the effect of Darwin by comparing the way in which Linnæus classified plants and the "natural orders" into which scientists group them to-day. Linnæus noticed that although the number of certain parts of the flower differed from species to species, every flower within a given kind had exactly the same number as all the others. He therefore grouped flowers by this means, so that all you had to do, if you found an unknown flower was to count its parts and look it up in the list under the appropriate heading. But apart from this the grouping was meaningless, two flowers next door to one another would have no resemblance except the purely artificial one on which their proximity was based. The natural system, which has now taken the place of the other, groups the species into families by their true kinship with one another, so that the types closest together in the evolutionary scale are also closest together in the scientist's list of plants, and that list becomes in fact a revelation of a fundamental truth, of evolution itself. The higher plants are grouped with the other higher plants and the lower are in their places at the bottom of the scale.

Now the classification of races of men does not attempt any such arrangement: it is purely artificial because scientists can find no way of showing that one race is higher or lower than another, except with reference to one single bodily character which may be picked out and shown to be nearer the apes than the same character in another race.

The classification of mankind into race types is nothing more than a convenient way of grouping those types for reference: it tells nothing at all about the relationship

between race and race. Perhaps one more example will make this quite clear: an alphabetical index is an artificial classification useful only for purposes of finding things quickly; thus for example in the card index of the New York Public Library on one drawer appear the two names Marx (Karl) and Mary (Virgin) indicating that that drawer contains the slips of all books on subjects between those two alphabetically. Marx (Karl) and Mary (Virgin) have nothing to do with one another and it is an artificial accident which brings them together.

The classification of races produces results as artificial as this: it is no more than a convenience for the memory.

§ 2. WHAT IS A RACE?

The scientist wants to classify the types of human beings which he finds scattered about the world. He knows that everywhere he finds groups differing from one another in several different ways: their bodies are not alike nor are the languages they speak the same, their arts and crafts vary, and he could take any of these as the basis of his classification.

Suppose he takes languages, and classifies all the people of the world according to the words they utter; he will find no merit in his work, it will be unstable and senseless because individuals and whole peoples have often changed their languages and there would be no point, at least from a biological point of view, in a classification of mankind which put the American Negro and the Englishman together, because they speak the same language and

separated the American and African Negro on the same grounds.

He chooses to group his human beings according to their physical qualities: and immediately he is faced with the fact that no two human bodies are really alike. Are there any physical characters that are held constantly enough (by all the individuals) in separate groups to distinguish one group from another? Are there characters which when individual differences have been averaged out prove different for different groups?

The scientist considers all sorts of physical characters and finally he chooses two as suiting his purpose best, they are the type of hair and the shape of the head: all human beings have straight, curly or woolly hair, all human beings have either long heads or round heads, and these characters are constant enough in given groups to be useful for classifying them.

Human races are classified therefore in three main classes according to their hair and further subdivisions are made within these main classes based upon the head shape. A moment's thought reveals how artificial and meaningless these divisions are: they serve the same purpose as the alphabetical card index drawer which puts side by side Marx (Karl) and Mary (Virgin), they help you to find any particular thing as quickly as possible.

Neither hair character, nor head shape can be considered very important from the point of view of civilization or culture: nobody is likely to call them into account when choosing a man for a job, nor are they essential in our estimation of a person's work as a friend or as

an associate: yet they are the only characters found stable enough to be used in distinguishing one race from another. The type of hair is due to a very simple matter: if you have two long rods, one round in section, the other oblong the first will stand up straight while the other curves: and that is the difference between straight and curly hair, straight hair in cross-section is round, curly is oblong and woolly is merely still more oblong than curly.

The shape of the head for purposes of race classification is determined by expressing the maximum breadth as a percentage of the maximum length: if the percentage is above a certain figure it is a broad head or a brachycephalic, if below a certain figure it is a long head or dolichocephalic and intermediate sized heads are called mesocephalic. That is all these formidable words mean: they express a ratio between two lengths which is absolutely meaningless in itself except that in arranging a group of skulls it is useful to arrange them by their shape as expressed by the ratio of two measurements.

That is the naked truth about race differences: the most fixed and reliable are hair texture and head shape.

§ 3. ARE THERE ANY PURE RACES?

But the truth is even less than this: there are practically no pure races to be found in the world to-day and all that we can say for such conceptions as long-headed straight-haired races and round-headed curly-haired races is that they are guesses at types which may once have existed as pure race types in a far distant past, before migrations

and mixtures obscured the boundaries and blended the peculiarities of our ancestral stocks. Only in the most isolated parts of the world, in islands such as the Andamans, do we find possible thoroughbreds; the rest of the world is populated by mongrels.

Let us recapitulate the history of mankind from its start in the distant pleistocene period of the world's geological age. First there arises a human form which increases and multiplies; then, urged on by climatic changes, overpopulations and other causes the original undifferentiated man began to migrate to all the quarters of the globe and to meet everywhere different climates and conditions and to be reacted on by all these special environments, being changed by them and branching out into specialised types. Then comes the second great period when all these types or races surging about the world began a process of blending, of mongrelisation, which is still going on about us every day. Thus from unity to multiplicity of type and back again to unity swings the pendulum of man's racial history: and we begin to see why the scientists call race a hypothesis rather than a fact; it is a convenient expression to represent a group of ideas which cannot in practice be proved to exist.

There is one other point that should be explained here: we must distinguish very carefully indeed between a human race and an animal species. A horse and a donkey belong to the same family, but they are different species: that is, they are more like one another than either is to a cow, but they are less like one another than a farm horse is to a race horse. The exact point at which the difference

between two animals separates them into two species is when their offspring if they are paired is sterile. Thus a mule is the hybrid offspring of a horse and a donkey; it is sterile, and, every time more mules are desired, they must be bred from horses and donkeys again.

No human beings are anything like as different from one another as that: all can interbreed and most have: so that all we can say about race differences is that they are convenient means of classifying human beings due only to quite superficial and comparatively recent environmental differences playing on the single and unified nature of the human organism.

§ 4. NORDICS, ALPINES, MEDITERRANEANS

Let us now consider briefly in the light of the above scientific explanation what can be said for the division of the European population into three races, the Nordics, the Alpines and the Mediterraneans.

Let us first assume that these three types exist and consider the scientific basis of their nature, and for this purpose we may tabulate the physical characteristics as follows:

Nordic Race: Dolicocephalic: fair wavy hair: blue eyes and light complexion: tall.

Alpine Race: Brachycephalic: dark straight hair: dark complexion: heavily built.

Mediterranean Race: Dolicocephalic: dark straight hair: dark complexion: short.

How far can you find these three races in actual ex-

istence to-day in Europe? In order to emphasise its crucial importance let us quote once more the passage from Ripley already used in a different context. "Experience proves that the vast majority of the population of this continent [Europe] shows evidence of crossing, so that, in general, we cannot expect that more than one-third of the people will be marked by the simplest combination of traits. We need not be surprised therefore that if we next seek to add a third characteristic, say the shape of the head, to a normal combination of hair and eyes, we find the proportion of pure types combining all three traits in a fixed measure to be very small indeed. Imagine a fourth trait, stature, or a fifth, nose, to be added, and our proportion of pure types becomes almost infinitesimal. We are thus reduced to the extremity in which my friend Dr. Ammon of Baden found himself, when I wrote asking for photographs of a pure Alpine type from the Black Forest. He has measured thousands of heads, and yet he answered that he really had not been able to find a perfect specimen in all details. All his round-headed men were either blond, or tall, or narrow-nosed, or something else that they ought not to be."

In short the Nordic Race does not even exist, let alone dominate history. It will be readily seen that all the separate physical features which comprise the theoretical Nordic would be transmitted as separate "unit characters" to the offspring so that mongrels would exist with any or all the characters blended with others.

Moreover even the theoretical Nordic is not considered to be in any way a pure type: one ethnologist believes it

to be a blend of three more primitive types one of which is a bleached negroid. This theory will not commend itself to Madison Grant's southern supporters.

§ 5. ARE THERE PSYCHOLOGICAL RACE DIFFERENCES?

At this point the reader may say: "Are there no more important differences between the different races than that their heads and hair are different shapes? What about the passionate Mediterranean and the silent Nordic? Are not some races more capable of producing a culture than others?"

As will have been seen in the second part of this book pseudo-scientists have constantly argued: "Clearly some races are more highly civilized than others, this means that some races have greater inherent power of producing civilizations than others: everybody knows that England is better governed than Spain, what further proof do you require that race counts?" We must give the positive and negative results of scientific research into the possible psychological differences between races.

It will be conceded that unless some inherent differences can be found between a Negro and a European there is little likelihood that any differences will be found between a Nordic, an Alpine and a Mediterranean. In looking for our differences we must only look for those which can have no kind of origin in the facts of the individual's environment. Thus a Polish immigrant lately arrived will not read English as quickly as an American born man, on the average he will be slower and less advanced in every

way because he will be fighting the difficulties of learning a whole new environment as well as his new job: he will have two tasks to the other's one.

The best proof that a Negro is inferior to a white man would be if his structure of his brain proved to be simpler and less evolved: are there any anatomical differences between the Negro's brain and the white man's?

Such differences of a slight nature have been found but as Boas sums up the results: "there is however no proof whatever that these differences signifiy any appreciable degree of inferiority of the Negro . . . for these racial differences are much less than the range of variation found in either race considered by itself . . . The anatomy of the American Negro is not well known; and, notwithstanding the oft repeated assertions regarding the hereditary inferiority of the mulatto, we know hardly anything on the subject."

It will be readily believed that if nothing can be found in the anatomy of the Negro brain to distinguish it from the European nothing can be learned from anatomy about race differences of an intellectual nature between Nordic, Alpine and Mediterranean.

What has been discovered with regard to race differences from the applying of intelligence tests to backward peoples? The most thorough body of evidence on these lines is that obtained by the Cambridge Expedition to the Torres Straits. All sorts of tests—visual, auditory, tactile—were given the natives, who belong to a relatively "low" type, and the results compared with those of tests given to university undergraduates. The final results

were purely negative: they have been summed up by Professor Woodworth as follows:

"We are probably justified in inferring that the sensory and motor processes and the elementary brain activities, though differing in degree from one individual to another, are about the same from one race to another."

The researches of Miss Dorothy Hallowell are also of importance: they disprove the common theory that dark races have superior eyesight to white races. Strong and Morse examined one hundred and twenty-five Negro children, ranging in age from six to twelve years, in South Carolina; as compared with white children from towns the tests showed the Negroes inferior but the white children of mill hands proved almost as low and far beneath the average of the town children, so that the racial difference was far less than the environmental difference. Other researches all bear out the same negative conclusion, namely, that *science can find no evidence whatever that one race is inherently less intelligent than another.*

It is very important to emphasise one point: science cannot permit argument from differences in physical characteristics to differences in mental characteristics. Because a man has a long head and another man has a round one, it does not follow that there are any differences between the contents of their two heads. On this important point we may quote Ripley once more: having defined head form, the cephalic index as: "simply the breadth of the head above the ears expressed in percentage of its length from forehead to back . . . when it rises

above 80, the head is called brachycephalic, when it falls below 75, the term dolicephalic is applied to it," he comments thus:

"This shape of the head seems to bear no direct relation to the intellectual power or intelligence. . . . The broad-headed races of the earth may not as a whole be quite as deficient in civilisation as some of the long heads, notably the Australians and the African Negroes. On the other hand, the Chinese are conspicuously long-headed, surrounded by the barbarian brachycephalic Mongol hordes, and the Eskimos surpass the Indians in culture. . . . Europe offers the best refutation of the statement that the proportions of the head mean anything intellectually. . . . Equally unimportant to the anthropologist is the absolute size of the head. . . . Popularly, a large head with beetling eyebrows suffices to establish a man's intellectual credit; but, like all other credit, it is entirely dependent upon what lies on deposit elsewhere."

§ 6. THE SUBJECTIVE NATURE OF RACE DIFFERENCES

Thus science can find no justification at all for any belief in the inferiority of one race compared with another: we must therefore look elsewhere for an explanation of the manifest fact that some races at this given moment in time, we call the present, are more developed culturally than others. First of all let us consider the effect of the personal equation upon judgments.

Haddon has pointed out that "practically all peoples look upon their own physical characters as constituting

the normal type and consequently regard those that differ from them as being strange and even repulsive." A slight scientific knowledge is of course brought to substantiate such a prejudice and we find people talking about the thick lip of the Negro as "primitive" and "animal." Science however cannot admit the justice of such a judgment for among the characteristics which delimit man from the apes physically an important one is the acquisition of an external lip: in this feature therefore the Negro is even more remote from the ape than the white races. When we consider that such matters as nonconformity in small details of fashion are regarded by many women as degrading their wearer, it is not difficult to justify the statement of Haddon, "a race type exists mainly in our own minds." In other words the inferiority of the Negro is due not to his germ plasm as such, but to his brown skin and that not because a brown skin is in itself inferior, or a mark of inferiority but because to the dominant race a brown skin is offensive. If it is true that a red rag is disliked by bulls, then a red rag is a handicap to one crossing fields inhabited by bulls: in exactly the same way a brown skin is a handicap to a Negro: and as we are ashamed of a prejudice against brown skins we employ pseudo-scientists to make out that it is all a matter of germ plasm.

We may sum up by quoting two more scientific dicta about race:

"In the actual state of science the word 'race' is a vague formula, to which nothing definite may be found to correspond. On the one hand the original race can only be said to belong to

palæontology, while the more limited groups, now called races, are nothing but peoples, or societies of peoples, brethren by civilization more than by blood. The race thus conceived ends by identifying itself with nationality."

and finally these words of R. R. Marett, head of the Oxford University School of Anthropology:

"Judged simply by his emotions, man is very much alike everywhere, from China to Peru. They are all there in germ, though different customs and grades of culture tend to bring special types of feeling to the fore."

§ 7. SUMMARY ON THE NORDIC MYTH

It will be instructive to sum up the above statement of the scientific position towards race as it affects the contention that the Nordic Race is superior to the other European races and consequently to all races whatsoever.

1. If there is such a thing as a Nordic Race it is only a conventional subdivision of humanity invented by scientists for purposes of classification.

2. This Nordic Race artificially invented is that part of humanity which is found in Europe and has light, wavy hair, a long head, tall limbs, a fair complexion, and blue eyes.

3. People with these characteristics are not often found in large groups but are merely an element in a general mixture of population.

4. There is no reason to suppose that the element called Nordic found mixed in greater or smaller percentages in the European population is itself a pure element. It may

for example itself be a blend of three earlier race stocks, the Caspian, the Mediterranean and the Proto-Negroid.

5. Even if a Nordic physical type may be imagined or even found on occasion there is no scientific justification for attributing any special psychological qualities, emotional or intellectual, to it.

6. Race as such—that is, biological inheritance held in common with other members of a group, has had no part in Nordic history.

7. Nordic supremacy is due therefore either to the personal prejudice of the observer or to the accidents of environment and the past history of Nordic peoples.

8. This Nordic supremacy, if it is conceded to exist at the moment, is in no way a permanent quality but an accident of time and space, likely to be destroyed by future accidents.

§ 8. SOME COMIC RELIEF

By way of comic relief from these serious pages it will perhaps be permissible to sum up some of the absurdities of the Nordic Myth as they are ridiculed in an article by Mr. Belloc.

Mr. Belloc wrote an essay on Nordics in an English literary journal and followed it up with a series of "answers" to alleged corespondents. Among these useful though imaginary beings three especially stand out as worth quoting.

The first according to Mr. Belloc "is puzzled at the aptitude of the Romans in their best period for administra-

tion and government, and even in a primitive fashion, for war; . . . he asks me—rather crudely—how this was possible if the Mediterranean race were as vile as our greatest authorities have discovered it to be." Mr. Belloc says that the answer is of course simple, those that governed the Empire and led the armies called "Roman" were Nordic. "This could be proved in several ways, but all of them might be open to objection save the unanswerable one that if these men had not been Nordic, they could not have succeeded as they did. The Scipios, the Julian House, Hadrian—to cite at random—were manifestly and necessarily Nordic: for men do not act as they acted unless they are of pure bred Nordic stock. . . . The committee which we collectively call by the mythological term 'Homer' and which drew up and passed certainly the Iliad and possibly the Odyssey, were clearly Nordic in composition. Catullus was as Nordic as he could be. The Nordic character of Aristotle is a commonplace. Dante was Nordic. So was Leopardi."

The second correspondent had had his cephalic index measured and found to his horror that, though he was Nordic by descent, it proved to be "an extreme form of Alpine." "I can assure him," says Mr. Belloc, "his anxiety is groundless. Though, of course, skull measurement is the basis of the three great divisions, yet if a man have Nordic qualities clearly apparent in his birth and culture, these easily predominate over what might be the natural tendencies of brachycephalic humanity. It would be a fine state of things, indeed, if we had to rule out of the Nordic excellence all those great men of the English past

who, so far as we can judge from their portraits, had something flat-headed about them." The third correspondent, a lady, was obsessed with doubts of a nature which may have already occurred to some of our own readers. She had five children, of whom the eldest and youngest were Mediterranean, the second "painfully" Alpine, the fourth clearly Nordic, and the middle, a mixture of all three.

"I would have her note . . . ," says Mr. Belloc, "that even if these varied types appear in her family, it is not remarkable, for all three types are present in England. Moreover, she may have travelled."

Perhaps, after all, the best way to meet arrant stupidity is to laugh it out of court in this fashion: what a weapon indeed truth would have in laughter, if only everybody had a sense of humour.

CHAPTER IV

CONCLUSION

It remains to collect the various trains of thought suggested in these pages and to attempt to describe the direction in which they lead.

Our problem in its widest form is to consider how society, civilization, the human race, can avoid the disaster, which will befall them if they prove unfit in the struggle for existence. That the possibility of such a disaster is real, is borne in upon us directly we comprehend the true meaning of evolution and the extent to which human nature has tampered with the "rules," by which successful animals have achieved their success in the universal struggle. Can the human animal by reason of its immense advance in intelligence, foresight and imagination do what no other animal has done, that is, achieve a permanent rather than a temporary victory over change? Or must we too give way and degenerate after a geologically brief period of dominance?

Let us begin with human nature. "You cannot get away from human nature" is a sentence usually used by that type of "practical" man, who is really just an unimaginative man: he finds it valuable for stopping argument about any theory of social improvement; but it may quite as well prove a starting point for a thesis, having its futil-

ity as a platitude redeemed, in part, by its vagueness, out of which may possibly come some useful characters.

That *you* cannot get away from human nature, is perfectly true: but it should never be forgotten that human nature is permanently occupied in getting away from itself: indeed if we want to define our term we must do so relatively to a given time and a given place. All that has most meaning and most significance to us in "human nature," is dependent upon its context and when we try to give it an absolute definition, apart from the special accidents of time and space, we rob it of all that is really valuable. True all human beings need to eat, all have sexual desires, all will do their best to avoid being run over crossing the road, but when you have finished saying that, you have not begun to say anything interesting about human beings.

Norman buildings were made of stone. We can imagine a young man of the period discussing the possibility of a different shape of arch, and the contemporary rotarian replying "Well, you see, you can't get away from stone." In due course Gothic arches came into fashion and the significance of Roman and Gothic architecture was, not that they were similar in the use of stone, but that they were remarkably dissimilar in the forms into which the stone was wrought. So with human nature, the part from which you "can't get away" is no more important than the stone; and just as we should call a man a fool who said that all architecture was alike because it was all made of stone, so we will call him a fool who is over-impressed by the astonishing fact that everybody eats

and sleeps and who deduces that human nature never changes.

What are the forces which bring about these changes? Are they heredity, or environment, physical surroundings, ideas, economic systems or what? How far can we capture these forces and control them scientifically? The authors whom we have examined believe that race and heredity, that is, two manifestations of what are really the same set of forces, are the important factors and the factors through which we can and must control changes in human nature: but we have seen that their theories are not based so much on scientific knowledge as on emotional prejudice and that even if there was truth in their words we should be no nearer our ultimate goal, that of controlling the forces.

Indeed this matter of heredity and environment resembles nothing so much as a first class dog fight and the scientists are intent on separating the dogs, punishing them for their fault, and healing their wounds. The first rule in stopping a dog fight is not to inquire which dog started it, but to get hold of which ever dog offers the best opportunity for separation: and for practical purposes, even if heredity did start the trouble, should environment be more 'separable,' then environment is the more important factor. But the evidence as we shall see is that environment was, to continue the metaphor, the aggressor in the beginning.

Let us take a single contrast between two different types of human nature: the ancient Athenian and our own. The ideal of Athenian humanity was to be a com-

plete man, an athlete, a soldier, a councillor, a magistrate, a philosopher: all these activities were joined within every single citizen and in consequence every Athenian had the same ideal before him. You could grade him according to the extent to which he expressed this ideal; you could watch him coming under the influence of the same fixed series of influences; you could say that this Athenian was clever, valuable, remarkable, and that Athenian dull, useless, worthless, because one approached the ideal of a *complete* man, while the other fell far below.

Not only this, the Athenian could be a complete man because he was sheltered from the ill effects of want, of work, of business, of trade: these things were in the hands of slaves, who took from the citizens all material burdens, leaving them free to cultivate their minds and souls. Again the Athenian could be complete because his domain, geographically and intellectually, was restricted: all could get within the sound of one voice in Athens and all men of leisure—that is, every citizen—could hope to gather within his head all human knowledge, seeing that the little then known in detail did not yet swamp the memory and clog the reason by its intricacy.

We must then conclude that Athenian human nature was defined and conditioned by certain material facts of environment, by the small size of the state, by the existence of a slave system, by the nature of the climate: to these must be added certain accidents of history, the point reached in the evolution of human culture, the actual alignment of forces in the Mediterranean basin; out of these conditions sprang the historical fact of Athens; when

they ceased to exist, Athens also declined and fell. Given the same conditions again—an impossibility of the same nature as a person's dream of being twenty-one again with all his later won knowledge and experience—human nature would once more take on the spiritual garments of the age of Pericles. Why is this? Simply because the raw material of human nature—that is, what is imparted to us by physical heredity—is precisely the same, the man in the Bowery, or Chicago, or Dayton, Tennessee, had in him at birth the capacity to become an ancient Greek, but he never became one because his birthplace was not ancient Greece.

Now let us contrast ourselves with the Athenians: our environment has changed and taken on new forms in its natural evolution, the boundaries of our communities are vast, the possible boundary of our knowledge is beyond the horizon of any one man's mental vision, new human ideas have eliminated slavery in its Greek form and tumbled the respectable citizen into the turmoil of a working existence. Human life and potentiality are the same but actual human nature is utterly changed, the very idea of a complete man is a pious anachronism, we are all specialised men: indeed we are not *men* at all in any Athenian sense, that is we are not *citizens* as a man was a citizen in Athens; instead we are lawyers, carpenters, doctors, salesmen, miners, politicians, clergymen, soldiers, each with a different ideal, a different outlook on life.

Behind the reality of specialised half-men there still remains alive a desire and a faith that somehow the intel-

lectual and physical perfection of Athenian manhood can be attained in modern New York, if we could only control humanity in New York and use scientific knowledge to do so. Indeed many people set themselves an ideal of life or a standard to which they hope to "live up," which is impracticable and useless to them because it leaves out the effect of changed conditions. Now there is no great harm in a bank clerk with a taste for culture determining to be as like Socrates as possible, but there is no particular advantage arising from his whim; and yet people will come along and say, "Mr. Smith, such a remarkable young man and so determined to live the Socrates life," forgetting that in order to live the Socrates life, it is necessary to belong to the same sort of community whose ideals and public opinion moulded Socrates. Yet though this is so clear, heredity maniacs persist in looking at the problem of social control as one of getting Mr. and Mrs. Socrates to breed and preventing the Kallikaks from doing the same.

Let us take a bird's-eye view of our population: in any given community one in a thousand may be remarkable and outstanding in his gifts, one in a thousand may be mentally pathological, an imbecile, a waster, criminally insane: the other nine hundred and ninety-eight are ordinary men and women, none of them complete men either actually or potentially, but all of them capable of specializing themselves usefully in some direction. A program of scientific control may conceivably use heredity and genetics to achieve several different results. First,

it may try to eliminate the worthless individual altogether; second, it may try to increase the number at the other end of the scale; third, it may try to ensure the propagation and continuation of those already marked out as outstanding. It may formulate some rules, it may say that if one of the nine hundred and ninety-eight marries the pathological thousandth, it will have bad social results; it may say that if the one genius marries into the ordinary mass then there will come either the weakening of the genius stock or the raising of the ordinary stock.

Let us assume, *for the moment,* that this is a possible program: the first significant fact is that such a program is tremendously limited compared with the whole field of social need. Sociologically speaking, what happens to the nine hundred and ninety-eight is scarcely affected by it, the only persons about whose children heredity and genetics has anything to tell us at all are the very clever and the insane, and as these represent two out of each thousand of the population, it is five hundred to one that eugenics will have no great meaning in any particular case. An ordinary man has in him thousands of traits, some good, some bad, and in so far as they are heritable at all the likelihood of each trait appearing in the child is irrespective of what happens to all the other traits. In short it is very clear that if we are to control the nature and achievement of the nine hundred and ninety-eight, to stop the dog fight between heredity and environment we shall best succeed by pulling the tail of environment.

The laws of heredity can throw light on a small, specific part of our task, that much may be granted, but even where at first sight their lesson might seem most unequivocal difficulties of interpretation abound. We might believe it good for the community if epileptics did not marry, but epilepsy and great social worth have gone hand in hand too often to give confidence even to this assertion. Again there is a tacit assumption prevalent that society wants to be saved from its imbeciles, yet no imbecile has ever brought to his community a millionth of the sorrow and pain a Napoleon has brought. Society needs to be saved from its "great men," and in so far as the "great men" are practical people,—as distinguished from artists who are quite another matter,—their greatness owes more to the accidents of history than to predestination of the germ plasm. If Corsica had not belonged to France Napoleon would not belong to recorded history, had not the mob mind found in him its completest war-time expression, Mr. Lloyd George would not have achieved his transient distinction.

Hence we may say that the social worth of the one great man will be largely determined by the mentality of the nine hundred and ninety-eight; and the problem of control in its final analysis resolves itself into a question of influencing them. We know that the naked baby is the same whether its social milieu is to be Athens or Chicago: we can state emphatically that, though the small differences between man and man may be due to heredity, the great differences, the important differences are due

to what the social milieu does with the little differences.

Heredity and race, then, are significant for social control because they teach this primary law, that the individual is a Proteus, capable of every kind of mental shape or form and that it is the social milieu, which determines which of these capabilities shall be fixed immutably as the finished man. How then are we to safeguard humanity from its threatened degeneracy? Mainly by forcing man, the meddler, to order his social milieu with an eye on the lesson of biological evolution which teaches that the environment limits and fixes the content which nature gives. Animals had to take what they found around them, because they could not alter it; man can make himself in whatever image he likes by choosing the environment which will call forth that image.

It is strange to contemplate what would happen if a man with sufficient money to carry out the experiment would buy, for a few cents each, a number of new-born infants and bring them up in some Pacific island. The inhabitants thereof, instead of, as now, being the victims of rum, civilized diseases and the rapacity of unscrupulous traders, would be slaves, under another name, who would minister to the needs of a simple standard of living; while the children, growing up, would be submitted to the influence of classical ideals, to athletics, to music, to philosophy and would have their dealings with the outside world limited to contact with a few men and women chosen for their special qualities. In so far as the old Greece could be reconstructed about them, the old Greek

would be freed once more within them and soon the old gods would be recreated in the ancient image and hover above them. But the world would have its problems still unsolved; nor will those problems be solved by partial attempts to establish such an ideal as we have outlined within our modern environment: yet that is what is attempted by those who think they can graft old ideals, however beautiful, upon new conditions.

Scientific control then must be based upon a realisation of the part played throughout nature by the milieu in the moulding of the individual. The sociologist can very well be thankful for what he gets in the way of germ plasm; nature has gone to great pains to standardize the product, and man has a very free hand in the uses to which he may put it.

The laws of heredity and evolution and biology in general can only suggest one thing to the wise observer: that the statesman needs to know them in order to understand his raw material, but that he can lay no hopes at all upon any effort of his to legislate for the germ plasm. There is only one chance of avoiding the supreme danger to the human race: that danger is the same for man as for all other living organisms, namely, the danger of not being able to conquer the difficulties of the environment, of failing in the struggle for survival; and since the antagonist in the struggle is the environment, and since man through Prometheus controls and alters it, man can disarm and weaken his enemy by his own magic and thereby free himself and reign supreme. Not by generation but by creation, not by controlling the living being but by

controlling the world into which it is born, will the scientific statesman of the future avoid the rocks and steer his ship into the temporary haven which is the best he can ever expect in the incessant flux of time and change.

THE END

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